LECTURES ON SURGERY,

DELIVERED BY

MR. WARDROP.

INTRODUCTORY DISCOURSE.

The science of medicine, since an early period of history, has been divided into two grand branches, one of which has been designated by the term Surgery, the other by that of Physic.

However indefinite and unphilosophical such a division may be, yet the term surgery, in its usual acceptation, will sufficiently answer as a general title to the lectures which are now to engage your attention. But before we consider any of the particular parts of this course, I propose to offer some general observations for your consideration, and to point out what appear to me to be some important circumstances which ought to be attentively considered in studying this characteristic division of the science of medicine. At once then it may be stated, that in order to acquire a *knowledge* of surgery, it is essentially necessary that you should be well acquainted with the natural structure of the human body, that you should be well acquainted, not only with what Bichat very properly denominated *general* anatomy, or the anatomy of the different textures or tissues which enter into the composition of the body, and also with *special* anatomy, being the anatomy of particular organs, but that your attention should be particularly directed to what has been denominated *relative anatomy*, or the anatomy of regions, by which term is to be understood the relative positions which the different parts of the body are known to occupy.

In the study of any of the sciences, but more especially of a subject so boundless as that of medicine, you must be well aware that years of application are necessary to qualify you for the discharge of the important duties that are involved in the practice of a surgeon, and that nothing but habits of the most unwearied diligence will enable you to acquire a competent knowledge of that profession, even after a prolonged course of study.

There is, however, a charm, more particularly in the branch of medicine under consideration, which will assuredly reward your utmost diligence. Surgery is, above all others, that science which, when skilfully directed, will enable you to be most useful to your fellow beings, and thus place you amongst the most esteemed members of the community. As an intellectual pursuit, surgery opens an inexhaustible treasure of the most interesting description; whilst it offers to the diligent, as well as to the ingenious, many paths yet unexplored, in which a rich harvest may be gathered.

You cannot trace back the history of surgery, even for a few years, without being gratified with the extraordinary rapidity with which it has advanced, and the perfection which many of its branches have attained. Thus the rules laid down for performing many operations, appear to be as nearly perfect as human experience and reason can, probably, render them.

But, it is not in the *manual* part of the art that modern surgery has to boast of its most important improvements; the successful application of medicine in the cure of diseases, thereby *preventing* the necessity of operations, ought to be considered as the perfection, or, rather, the triumph, of this science, by every intelligent, philosophical, and humane practitioner.

You ought not to allow yourselves to believe that *success* in the performance of surgical *operations* can ever prove the legitimate basis of your professional character and reputation. When we look back into the history of surgery, we honour the memory of those men who have unveiled the principles of the science, whilst the names of those surgeons who are chiefly known from the boldness, or, rather, it should be said, the rashness, of their operations, elicit from us neither admiration nor respect.

In the history of operations it is indeed humiliating to contemplate the number that have been performed unnecessarily. I say it is humiliating, because it cannot be denied that unfortunate results must have arisen either from the imperfect knowledge which the surgeon had of the disease, and the inadequacy of his remedies, or from a still more disgraceful cause, a desire of performing operations merely for self gratification and applause.

Surely John Hunter's name would have been as much renowned though he had never performed an operation. He has, perhaps, justly been considered, as the greatest surgeon which this country ever produced; yet his surgical character had nothing to do with the handicraft part of the profession, the great contributions which he made to surgery having solely arisen from the ingenious application of principles newly discovered by him, and from his philosophical investigation of diseases.

It is difficult, perhaps, to be explained, but it is not on that account the less true, that some individuals seem absolutely to have a predilection for performing surgical operations: whereas we should naturally suppose that nothing would be more repulsive to our nature than the infliction of pain on our fellow beings.

But there is a further source, whence, in many instances, this line of conduct derives its origin—a love of the reputation of being called " an operative surgeon."

" The passion of acquiring character in operations," says the late Mr. John Bell, " is surely full of danger, it is fit for those only to profess, who have no higher claim to public esteem." And again: " Those qualities which relate to operations and other public exhibitions of skill are of a very doubtful kind, while the duties of humanity and diligence are far more to be prized; they are both more amiable and more useful."

Some of you may have heard of instances where surgeons, in other respects deservedly eminent, forgetting the duties of civilized life, have attempted a kind of theatrical effect in performing operations, for no other purpose than to give bystanders a false impression of their dexterity, coolness, and presence of mind. The celebrated surgeon, whose name I have just quoted, remarks, " that affectation of dexterity, or doing operations quickly, is but a pitiful ambition in those who use it;" adding, " but you will invariably observe, that none except those who are deficient in moral courage, either find it requisite or think it necessary to resort to such conduct; and that a man who feels himself equal to the task he undertakes, proceeds deliberately and calmly, steadily bearing in mind the grand object —relief to the patient."

Operations, indeed, have also been considered by some as a kind of property, and I have even known serious disputes arise amongst medical men in deciding who was to have the pleasure, or rather to derive the profit, of using the knife. In conversation with a surgeon of extensive practice, who was mentioning his extraordinary absence of success in the removal of cancerous breasts, he was asked why he continued so bad a practice; to which question he replied, " that if *he* did not perform the operation some other person would, and he did not see why he should not have the *advantage* of doing it."

Let me, therefore, urge you to use every endeavour to check in yourselves any disposition you may have to fall in love with operations, always to consider them as the last resource of your art, and never to have recourse to them but under circumstances where no doubt exists in your own minds of the after welfare of the patient demanding such measures.

Nothing, however, can so effectually dissipate any fondness you may have for the performance of operations, as the acquisition of that comprehensive knowledge of medicine, the practical and judicious application of which will render such operations not only unnecessary, but highly improper.

While, therefore, I shall earnestly endeavour, in the following course of lectures, to make you familiar with the various operations, to explain the principles on which they are performed, and the best mode of executing them, your attention will be in an especial manner directed to the *treatment* which ought to be adopted, both *before* and *after* operations.

But whilst I am thus deprecating improper operations, you must not suppose that I consider them to be of little importance, or that I believe a competent knowledge of them, and a capability to perform, are to be very easily acquired.

No man who has ever performed an operation, and who has done it well, will tell you that it is to be done easily; and the surgeon who pretends that the performance of operations costs him little trouble, must either do them very indifferently, or, if he had taken more pains, would have done them much better. The most experienced and best surgeons have all declared, that however collected and composed their minds may have been during the performance of an operation, yet they have always suffered more or less anxiety before it was commenced; and so various and multiplied are the circumstances connected with most surgical operations, that my observation of others, as well as my own personal experience, has taught me that no operation can be well done, unless the various steps of it have been matters of previous deliberate consideration. It is said of Cheselden, who was one of the best operators England ever produced, that he suffered great uneasiness and anxiety when he had an operation to perform, though he felt the most perfect tranquillity and self-command when the operation was commenced.

I have long made it a rule not to perform operations hastily, however trifling, having found, that if they be undertaken without previous arrangement and consideration, something awkward always occurs.

You ought also to guard against a too prevalent opinion, that many diseases are of a *trifling* nature, and do not merit the minute and diligent attention of a great surgeon, or of a learned physician. Such notions are highly reprehensible at all periods of life, but more particularly in youth. It is your duty to pay as much attention and bestow as much care in curing one disease as another; and whatever opinion *you* may entertain, you will find patients just as desirous of getting rid of a comparatively trifling ailment, as of a disease which, from its rarity, or from any other cause, you may consider particularly interesting. Besides, you will find that diseases considered by many of minor importance, will often afford, from their frequent occurrence, most interesting sources of contemplation. I can conceive nothing more mortifying, than for a medical man who assumes a high professional tone, to be called upon, from some accidental circumstance, to treat a complaint, the knowledge of which he had presumed to think beneath his attention. It is for the cure of less urgent cases, that *young* practitioners, especially, are usually called on to act; and it is in proportion as they acquit themselves well or ill on such occasions, that an opinion is formed of their professional character. Do not, therefore, allow yourselves to be led astray by what are too often called good cases and grand operations, but bestow an equal share of diligence in studying every disease that may fall under your notice. Consider every complaint worthy of your study, until you have made yourselves familiar with its nature and treatment.

The minute attention bestowed on diseases of an apparently unimportant character, by men who had risen to the highest point of professional fame, in early days, struck me as extraordinary. This was a characteristic trait in the conduct of the late Dr. Baillie, and I noticed the same thing in the late Mr. Cline, both beloved by their professional brethren, and the most eminent practitioners of our times. So long as you consider yourselves to be members of the medical profession, and offer yourselves to the public as practitioners, so long ought you to feel bound by every tie to execute whatever professional duty may be required at your hands.

A man may reject such professional employment, as, in point of mere pecuniary remuneration, he may not choose to accept. But in all cases of human distress, where prompt assistance is required, and you alone happen to be present and capable of affording it, you would be highly culpable if you did not render every aid in your power. I have known more than one instance where medical men, who either could not or would not *bleed* a patient, have brought much discredit on their professional character; and a case occurred not long ago, wherein a lady who was suddenly taken in labour, sent for a physician residing in the vicinity, her accoucheur not being to be found; when the answer of the physician was, that "he was ignorant of such cases." So strong was the sensation created in the public mind by this open declaration of incompetency, that in order now to obtain a medical degree in the University of Edinburgh, the candidate must show his knowledge of *midwifery* as well as of the other branches of medicine.

The regiment to which Ambrose Parè, the celebrated French surgeon, was attached, having been engaged in a skirmish, a lieutenant got so desperately wounded, that the commanding officer absolutely proposed to dig a ditch and throw him into it, saying that they might as well do that, as leave him to the mercy of the enemy, the regiment being compelled to march immediately. But Parè, moved by pity, begged that the soldier might be allowed to go along with the baggage, saying that he might yet be saved, and that he was willing to dress him and to cure him. This was accordingly granted, and, says Parè, "I put him into a well-covered cart, and became at once his surgeon, his apothecary, his cook, and his nurse; thank God I did cure him in the end, to the admiration of all the troops; and out of the first booty, the men-at-arms gave me a crown a piece, and the archers half-a-crown each." So great, indeed, was the impression of Parè's generosity and kindness, and such was the extraordinary influence that the surgeon had on the minds of the French troops, that his presence was sufficient to procure the confidence and devotion of the whole army, of which some remarkable examples are cited in history.

A similar instance of the happy influence of a benevolent and well-regulated mind lately came within my knowledge. One of our own countrymen, distinguished for his humanity, his professional knowledge, and his zeal, who was employed in a prominent situation with our armies during the last peninsular war, but who now practises as a physician in this city, some time ago received a reproof from one of his brethren, who told him, that the assistance he was then rendering a patient was not consistent with his dignity as a physician. To this he replied, that "he considered nothing beneath his *dignity as a physician* that could assist the sick, and that he had often got a little water and kindled a fire to make gruel for a sick soldier."

This attention to details, and what are called the lesser duties of life, we often indeed see performed the most cheerfully, by those whose elevated station in society would best entitle them to throw such duties on others. A bystander informed me, that he heard the Duke of Wellington inquiring of an officer about some minute details regarding the equipage of the troops, when the officer replied, "that he did not consider the knowledge of such things within his province."—"Not within your province!" exclaimed the Duke; "why, Sir, I know the number of nails in every soldier's shoe."

It has been supposed by some, that subdivisions in the practice of medicine were as advantageous to the public as the subdivisions in trades or manufactures. The man who would confine himself to one object of research in medicine, or to one handicraft occupation in it, would acquire a decided superiority over those who did not thus devote their exclusive attention to one object. But it is in medicine as in all other pursuits; the most distinguished in particular branches, are those who possess the greatest fund of general knowledge. If we look back into the records of medical science, and see who have most contributed to its advancement, we shall find that we owe almost every contribution to men of comprehensive learning and general knowledge; and in no case does it appear that those who have exclusively devoted their attention to the disease of a *particular organ*, have contributed to increase our knowledge of its pathology. If we look to the names of the HUNTERS and MONROS, to those of MORGAGNI, SCARPA, HALLER, RICHTER, BICHAT, PINEL, LAENNEC, &c., we find that their knowledge has been as comprehensive and general as their contributions to science have been numerous.

When we talk of an eminent statesman or of a celebrated general, we never suppose the eminence of the former to result from his knowledge of any particular part of political economy, or of the fame of the latter to arise from his eminence as an artillery or cavalry officer. We admit their superiority in all the branches of knowledge comprehended in their respective professions. The subdivisions, therefore, of medicine considered as a science, are not only unphilosophical, but prejudicial to its advancement.

We have now before us the example of civilized Europe, as well as of every seminary throughout these realms, to show us the propriety of considering a knowledge of the whole science to be necessary for the education of every medical student, and I hope ere long that the system of education in this metropolis will be extended, and that we shall wipe off the disgraceful imputation which has been so long cast upon us,—of there being a commercial or trading spirit pervading and regulating the system of education in all our medical institutions. Nothing was ever more true than Buonaparte's assertion that we are a nation of shopkeepers.

Besides attending lectures and studying the most esteemed works on the different subjects of your researches, I particularly recommend to your attention a third point,—the improvement of your *organs of sense*. To these we are indebted for our knowledge of all the external characters of disease. An inexperienced eye cannot distinguish the slighter shades of colour which are so familiar to the painter, nor the untutored ear those trifling variations of sound which are so readily perceived by the skilful musician. Nor can the touch convey the impressions of the nicer differences of consistence and form, until it has been disciplined. There can be no stronger proof of this power of improvement in our senses than is observed in those who, from accident or disease, lose one sense. Deaf persons acquire great acuteness of sight, and the blind become very perfect in the sense of hearing and touch.

These improvements do not arise from any peculiar changes of organization, but entirely depend on an increased exertion and closer attention. "The man," observes an enlightened writer, "who has acquired habits of attention multiplies as it were the number of his senses by enlarging the range of their activity, and by increasing their powers of discrimination."

The power of our external senses has been greatly increased in modern times by the assistance of art. The science of optics has extended the powers of vision, so that we can examine objects which are so small as to be perfectly imperceptible to the naked eye. We can perceive even the motions of the heavenly bodies.

There is also considerable acuteness in one or other of the senses of particular individuals, which enables them to exercise a quickness of perception, which other persons cannot acquire even after long-continued culture. Hence often arises an apparent discrepancy in the opinions of different persons on objects examined by the senses, and hence also the ridicule that some medical men in this country, either from the obtuseness of their own organs, or from a false pride in not stooping to acquire a new means of information, have attempted to throw on the *stethoscope*, an instrument devised for conveying to the ear those sounds which the heart and lungs communicate to the parietes of the chest, while exercising their respective motions.

The use of this instrument, in many forms of thoracic disease, conveys to the tutored ear information respecting the site and nature of the malady, as precise and important as can be derived in cases of calculus, from introducing a staff into the bladder.

This instrument, the stethoscope, the invention of Laennec, the greatest pathologist of our age, you ought all to possess, and acquire the habit of using. I have no hesitation in declaring, that since I began to examine the sounds of the chest by this method, and by percussion, I have learnt more of the diagnosis of thoracic diseases in a few months, than I had been able to acquire during many years of former application and inquiry.

We have already reaped, and we may still continue to reap, much important knowledge from our foreign brethren; and the great spirit of improvement which has been kindled amongst medical men, has no doubt arisen from the free intercourse now established amongst all the nations of civilized Europe.

The system in our schools, planned twenty or thirty years ago, does not accord with the present spirit of advancement, and, as was lately observed by a great statesman, "such is the ardour of the present age, and the strides made by the different nations for their respective improvement in the arts of polished life, that those who can't take a lead must at least follow." Any one who will patiently examine the strides which medical men in France and Germany have of late made, more particularly in the sciences of anatomy and pathology, and compare the number in either of those countries who are actively engaged in the prosecution of the various branches of medical science, with the number of men so employed in our own country, must admit that there is a decided pre-eminence among our continental neighbours—a fact readily explained, although not in a manner by any means agreeable to our feelings of nationality.

In those countries there are many situations held by medical men, such as professorships and offices in the hospitals, which afford sufficient means of subsistence, and are generally bestowed on men of proved and acknowledged talent, whose attention being but little occupied in private practice, they can devote a great part of their time to study, and thus maintain the most prominent positions in scientific pursuits. Whereas, in this metropolis, the capacity of a man is too often measured by the value of his private practice, and not by the extent of his information. If you inquire what any individual is doing here, and how he is succeeding, the answer you will receive will be a statement of the supposed amount of his professional income. But if a similar question be asked of an eminent man abroad, you will receive a very different answer; you will be told of any advancement he had been making in scientific pursuits. By nothing is the scientific foreigner more struck when he visits this metropolis, than the evidences of a *trading* spirit amongst the members of the medical profession.

Impressed with this view of the importance of cultivating the organs of sense, allow me, at the same time, strongly to recommend you, not to multiply unnecessarily the objects of your study, and whether you are learning from the works of authors, or from the book of nature itself, to be satisfied with having at one time a limited number of objects for your contemplation. How many there are who have enjoyed the most extensive opportunities for experience in their profession, but who, after the end of a long life, cannot boast of having made one single new observation; whilst many others, whose field has been more circumscribed, but more diligently cultivated, have materially promoted the various branches of practical learning.

It has been very aptly remarked by Richter, the late celebrated professor at Goettingen, and who was one of the most scientific surgeons of his day, "that it is not eating, but digesting, which gives strength;" and that "the experienced practitioner is not formed by the number of beds in his hospital." There were only fifteen beds in the public hospital at Goettingen, and the works of Richter, to which I shall often have occasion to refer, will enable you to form an estimate of the extent of the observations which may be made in a field apparently so limited. In the different clinical schools of the most enlightened men, the number of beds has seldom exceeded twenty, and if you take into consideration the proper objects of a clinical institution, it must be evident to you all that to attend and diligently to make yourselves acquainted with every circumstance connected with the cases, ten or fifteen patients will afford a full store of materials for your daily reflection. Although the Council of the London College of Surgeons have enacted, that in order to become qualified for an examination in surgery, you must attend an hospital having *at least one hundred beds*, yet I strongly advise you to select only a very limited number of cases for your study.

We are disposed to place too high a value on what is called experience, and yet neglect to devote that degree of attention which leads to a habit of minute observation. If we have seen numerous examples of a particular disease, we are apt to think that we must have a much better knowledge of that disease than a person who has seen it but a few times. I am not unwilling to confess, that at many periods of my own life, and particularly of later years, I have been in the habit of seeing many more patients than were sufficient to become subjects of study; hence it has to me been a constant theme of regret, that, every day, objects, which might have been the source of interesting investigation and useful reflection, have been so quickly succeeded by others of equal importance, that my mind has not been able to dwell upon them, and receive that information which might have been derived, had they been fewer in number.

Medical men often, without perhaps intending it, deceive others as well as themselves when they speak of having seen an immense number of cases of some peculiar malady, so that whenever I hear an individual talking of the extraordinary extent of his practice, and the numerous instances he has witnessed of a particular disease, I am reduced to the dilemma of either suspecting the accuracy of his facts, or of doubting the propriety of his conclusions.

We are all liable to deceive ourselves when eagerly embarked in some favourite pursuit, and are inclined to shape everything so that it may coincide with our own settled and often prejudiced views. Thus we multiply the number, and distort the objects, presented for our consideration.

I may also observe, that some of the most eminent men in every profession have not only struggled under the most limited opportunities of acquiring knowledge, but their want of personal resources has been frequently most harassing. A knowledge of these facts may console you in difficulties, and excite many of you to exertion. Poverty is a most powerful stimulus to labour, and it therefore happens, that persons who are excited in early life, frequently acquire habits of industry and application, which others, in circumstances of greater affluence, never attain.

You should be aware that you are now at a period of life when the mind is in a peculiar manner fitted to profit by instruction, and that, to use the language of an enlightened poet, " the blossom of the mind soon fades." Do not, therefore, allow the present hours to pass away without making the best use of your talents and opportunities. Devote yourselves to your professional studies with zeal and enthusiasm.

Whatever may be the original differences in the capacities of men, it can never be denied, that much is to be done by the culture of the mind; and it is equally true that this cultivation can be employed with much more advantage in the early than in the later periods of life. It is with the mind as with the physical frame, the energy of the mental powers as well as the muscular is increased by exercise.

" The faculties of the soul," says Locke, " are improved and made useful to us just after the same manner as our bodies are. Would you have a man write, or paint, or dance well, or perform any other mechanical operation dexterously, and with ease, let him have ever so much vigour and activity, suppleness and address, yet nobody expects this from him, unless he has been used to it, and has employed time and pains in fashioning and forming his head and other parts of his body to those motions. Just so it is with the mind. Would you have a man reason well, you must use him to it betimes, exercise his mind in it, observing the connexion of ideas, and following them in train."

The seeds of future reputation are sown at a much earlier period of life than is usually supposed, and the latter years are occupied in digesting and arranging the previously collected knowledge. It is a most erroneous doctrine to inculcate into the minds of youth, that they must trust to age and experience for the acquirement of useful knowledge. The period of education is to be considered the most important in their lives. You must not rely too much on your talents, and flatter yourselves that you can be qualified to practise the profession for which you are now preparing, without a severe course of study. In no department of life do men ever rise to eminence, who have not undergone a long and diligent preparation; for whatever be the difference in the mental powers of individuals, it is the cultivation of the mind alone which elevates to distinction. John Hunter was as remarkable for his industry as for his talents, of which his museum alone forms a most extraordinary proof; and if you look around and contemplate the history of those men whose talents and acquirements you most esteem, you will invariably find that their superiority of knowledge has been the result of a proportionate quantity of labour and diligence. "Success," Baillie observes, "as well as character, depends on attention to education. It is an ill-founded notion, arising from deserved disappointment, to say that merit is neglected. It is sometimes joined with circumstances that may have a little influence in counteracting it,—as an unfortunate manner or temper; but generally it meets with its due reward. The world are not fools; every person of merit has the best chance of success; and who would be ambitious of the public approbation, if it had not the power of discriminating?"

"All is the gift of industry;
Whate'er exalts, embellishes,
Or renders life delightful."—Thomson.

However requisite it may be for all to be industrious, yet there are, doubtless, advantages which will befall those who are preparing themselves for a profession to which their talents, as well as their tastes, are peculiarly applicable. When pursued with zeal,—to such men the study of medicine affords unceasing excitement, and it may certainly be considered as the most delightful of professions, both from the nature and object of its pursuits. Embracing a knowledge of all the sciences, an inquiry into the physical nature of man, and holding out the noble object of alleviating human ills, medicine ought certainly to rank above all other professions.

During your progress through life, you will find much to seduce you from your more serious studies. You must never allow occupations of pleasure to interrupt your professional pursuits. The mind must have a certain quantity of relaxation, but you should be careful that hours of rest are not employed in dissipation. Be assured, that there is no source of gratification so substantial as that arising from the improvement of the mind. By far the most certain road to happiness and success, is the accumulation of knowledge. Bodily affliction and worldly misfortunes may blight other sources of enjoyment, but those derived from mental pursuits are not within the reach of ordinary circumstances; they are as boundless as is the extent of human knowledge, they present an inexhaustible store of food to an appetite never satiated; and while they improve our intellectual and moral nature, they leave a beautiful halo at the sunset of life, which cannot be derived from any other pursuit.

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LECTURES ON SURGERY,

DELIVERED BY

MR. WARDROP.

THE DISEASES OF THE SANGUINEOUS SYSTEM.

General Remarks.—Of the Blood;—its Functions;—its "Living Principle;"—its Morbid Changes;—its quantity in Man;—its Sensible Qualities—Smell—Taste—Temperature.—Coagulation of the Blood;—its Phenomena;—Utility of Coagulation in Stopping Hemorrhage,—in uniting divided parts,—in the process of Reparation,—and in the Cure of Aneurysms.—Want of Coagulatory Power in the Blood,—sometimes Hereditary,—fatal Cases.—Treatment.—Consistence of the Blood;—Component Parts of the Blood. Serum,—Red Globules,—Coagulated Lymph.—The Buffy Coat.

Having in the last discourse endeavoured to point out what appears to me to be the true principle or the basis for the classification of diseases, I propose now to take a general view of the diseases of each of the systems or textures separately, dwelling more particularly on those affections which have commonly been treated of in systems of surgery. At the same time you must at once perceive how impracticable, indeed, I may say, absurd, it would be to presume to form anything like a classification of diseases of each of the systems which compose the body, and then to divide these into *external* and *internal*, or into those belonging to surgery and to physic. I have already remarked, that no nosological writer has even attempted so unphilosophical a task. In none of their works is there to be found any particular designations or marks by which the one can be distinguished from the other. It is, in fact, not the *science* but the *practice* of the profession of medicine which has been thus divided. In the early ages, medicine was not only considered as one science, but it was practised as one profession. At that period of history, learning was entirely confined to the priests, but a time afterwards arrived when the fathers of the church conceived that it was inconsistent with their pious duties to spill human blood, and this led them to devolve the *operations* of *surgery*, few and unimportant as they were in those days, into the hands of others. Hence arose the division of medicine into *physic* and *surgery*.

The class of diseases we now come to consider is that of the "sanguineous system," under which is included the various diseases of the arteries, the veins, the heart, as well as of the blood which they contain.

In attempting to draw up anything like a comprehensive nosological table of diseases, it would be of more importance to determine on the arrangement of each of the classes than is required for the present purpose; and I have deemed it most expedient to commence with the "sanguineous system," not only because the diseases of the heart and bloodvessels are numerous and important, but because they form an essential integral part in the composition of the other systems in a state of health, as well as exercise an influence in all their diseases.

But previous to considering the diseases of the vessels themselves, I propose to make some observations on the nature of the fluid which they contain, to point out its more remarkable diseased changes, and particularly to direct your attention to the different modes by which the blood is to be abstracted,—bloodletting being one of the most powerful and most generally employed curative means which we possess in the treatment of diseases.

Of the Blood.

The blood which is contained in the heart, in the arteries, and in the veins, is kept in a continual motion, called its *circulation*. During this movement it undergoes certain regular and constant changes in a healthy animal. It receives new liquids prepared by the process of digestion, and by cutaneous absorption; and it goes through certain changes in the lungs, where it is submitted to the action of the atmospheric air.

It travels throughout the whole body, furnishing to each organ certain materials whilst it is deprived of other parts by the various secretions. That the blood should have been considered as the *life* of the body need not be wondered at; for if its passage to any part be destroyed, that part dies; and if beyond a certain quantity be extracted from the system, the death of the animal follows. The blood is not only necessary for the life, but for the growth of every part of the body; and when any organ suffers an injury, it is the blood which is immediately employed for its reparation.

It is not, therefore, surprising that the blood should have been supposed to possess in itself a "living principle," an opinion first advanced by the ingenious HUNTER. The principle of life we must suppose to begin in some one of the component parts of a living animal; and as we observe a chain of phenomena commencing from the entrance of the food into the stomach,—the conversion of that food into chyle,—the mixture of the chyle with the blood,—and the life and growth of the various parts of the animal from that blood,—is it not as probable that the "living principle" is first developed in the blood as in any of the other constituent parts of the animal?

In order fully to comprehend the various functions of the blood,—the morbid changes which it undergoes,—its influence in repairing injuries,—and the various modes and effects of removing it from the body for the cure of disease, it will be proper first to call your attention to its component parts, and the alterations in its qualities and proportions, all which form important indications in the diagnosis of diseases.

Dr. HEBERDEN remarked, that neither the blood nor the urine can afford criteria for the treatment of diseases. I need not caution you against adopting such an unphilosophical opinion; and in proof of its erroneous tendency, I may refer to the subsequent works of Dr. PROUT on the *urine*, wherein you will perceive how important a comprehensive knowledge of the chemical qualities of that fluid is, in the diagnosis of the diseases, not only of the urinary organs, but of the whole system; and I have no doubt that if an equally philosophical and active mind were employed in the analysis of the *blood*, much important information regarding the morbid changes of that fluid, and the modes of remedying them, might be discovered. It has indeed been, of late, too much the custom to ridicule the humoral pathology; but this has not arisen from attentive investigations of disease. VELPEAU published a memoir wherein he observes how much the humoral pathology has been neglected, but of what great importance it is to become acquainted with the morbid changes which take place in the blood; and to illustrate this remark, he details some cases, wherein puriform matter was found floating in, and mixed with, the general mass of blood throughout the different large vessels, both arteries and veins. In these cases, abscesses in great numbers, though unaccompanied by the usual characters of inflammation, were found in various parts of the body.

It is extremely probable, that the qualities of the blood are considerably altered in many diseases, though such changes cannot always be detected. We observe, for example, a complete alteration in the serum in jaundice, and were it not for that change of colour, we should perhaps have no evidence that the blood was at all altered in that disease.

Quantity of the Blood.

With regard to the quantity in a man, HALLER supposed that about fifty pounds of fluid circulated in a person weighing one hundred and sixty pounds, of which he considered twenty-eight pounds to be blood.

There has not, however, been yet contrived any mode of ascertaining the precise quantity of blood in different people, and it is not at all improbable that the quantity may vary much in the same individual at different times; neither is it at all certain, whether persons afflicted with diseases which are relieved by the abstraction of blood from the system, have had an undue quantity of that fluid.

It is generally considered, that, in proportion to the size of their body, young persons have a greater quantity of blood than adults, that adults have a greater quantity than the aged, and that fat people have also less blood than lean.

That there is a great difference in the quantity of blood in different people would appear probable, from the circumstance, that if a succession of individuals be observed afflicted with a similar disease, and which requires the abstraction of blood for its cure, the quantity necessary to produce the same effect, varies very much in every different instance, which may probably depend on differences in the quantity of the blood in each person.

Sensible Qualities of the Blood.

Fresh blood emits a peculiar animal *smell*, and a thin vapour rises from it, which is nearly as insipid as water. It is glutinous to the *touch*, slightly saline to the *taste*, and its specific *gravity* is rather more than that of water.

The *temperature* of the blood has not been found to vary much in different diseases, its natural heat having been found diminished a few degrees in the cold fit of ague, and increased during inflammatory fever, and it has also been observed that the arterial is warmer than the venous blood.

Coagulation of the Blood.

Coagulation is one of the most important properties of the blood. Whenever blood is removed from its proper vessels, a process of coagulation takes place, and this coagulation happens sooner or later, according to particular circumstances.

Healthy blood coagulates in about three minutes and a half; the coagulation usually is completed in seven minutes, and in twelve minutes the mass becomes firm.

Blood coagulates in the ratio of its specific gravity, the lighter the blood the more slowly does it coagulate; and coagulation takes place more or less quickly, according as the orifice from which it flows is small or large, or the stream fast or slow.

Coagulation too is rendered more slow by cold. We observe it take place quickly when the blood is received into a basin or flat vessel, and it coagulates soonest if the vessel be metallic. Blood, which is kept at rest, coagulates more slowly than when it is stirred or agitated, and it coagulates most quickly when drawn through a small orifice, and allowed to trickle down the arm. Strong action of the arterial system appears also to dispose the blood to coagulate slowly, whilst, when the vascular action is diminished, as in fainting, coagulation takes place more quietly; and hence the assistance nature derives from syncope, in plugging up the orifice of a bleeding vessel.

The power of the blood to coagulate is essential for the performance of many important functions in the animal economy, whether in a state of health or disease. 1st. It is this quality of the blood which arrests the bleeding from a wounded vessel. 2nd. Coagulation is the means of limiting spontaneous hemorrhages, by plugging up the open mouths from which the blood is poured out; 3rd. It serves to agglutinate the divided edges of wounded skin; 4th. It is important in the restoration of a lost part in forming a covering to prevent the contact of the external air on the newly-exposed surface; 5th. It forms a parenchyma or matrix for the passage of new vessels, for the restoration and regeneration of parts that have been destroyed, as in the process of granulation. 6th. It is the power of coagulation which nature employs to prevent the bursting of an aneurysmal swelling; and, lastly, it is equally useful in plugging up the canals of diseased veins, and in agglutinating their wounds.

As regards *spontaneous hemorrhage*, it has been already observed, that this coagulating power of the blood answers a very important purpose. There are many diseases wherein an effort is made by nature to relieve the general system, or a particular organ, of a superabundant quantity of blood, and there is little or no disposition made to arrest its progress, until considerable debility or syncope supervenes, which promotes the necessary coagulation. And, moreover, when blood is lost by a wound, the diminution in the quantity of the blood, by retarding the force of circulation, creates a power in that blood to coagulate more speedily, and thus arrests the hemorrhage. Hence is derived the useful practical lesson of encouraging a state of syncope, in order to assist in stopping hemorrhage. Indeed, when syncope does take place during operations, we ought to watch the state of the wound after the syncope goes off before venturing to close it, for it will often be found that vessels begin to bleed, which, in order to prevent secondary hemorrhage, ought to be secured by ligatures.

The importance of this property of coagulation in the blood, is also exemplified in repairing injured or lost parts of the body. When the skin, for instance, is divided, an adhesion of the cut edges takes place, and this adhesion is effected by a quantity of coagulated blood being interposed between the lips of the wound. Here the coagulated blood seems to act as a mere bond of union, and I may observe, as a general rule, that whenever you are thus able to keep the lips of a wound together by the adhesive property of the blood alone, you will find it the most preferable mode, and the best plaster.

Hunter believed, that the coagulum thus formed between the edges of a wound, possessed within itself a power of generating vessels, and thus became organised; but whether under the ordinary circumstances of reparations, new vessels are formed in the midst of the coagulum, or whether they shoot into the coagulum from the adjacent surfaces, and are continuations of those which have been divided, it is certain that vessels meet together and anastomose freely in the coagulum, which, along with the nerves which are also supplied, ultimately constitute a complete organization of what originally was a mass of coagulated blood.

The power of the blood in coagulating for the purpose of the restoration of parts, is exemplified when a portion of the integument is accidentally removed. In such a case, coagulated blood is first deposited on the wounded surface, and coagulable lymph is then effused by the arteries between the coagulum and the wounded surface, for the purpose of forming a matrix for granulations, the growth of which granulations and their subsequent cicatrization repairing the lost part.

This power of coagulation in the blood is also employed by nature for the cure of *aneurysm*, one mode at least of spontaneous cure, entirely depending on this process. When an aneurysm is formed, the blood which fills the dilated part of the vessel, or the proper aneurysmal tumour, does not circulate either in the same direction or with the same velocity as in the natural condition of the vessel. The consequence is, that a process of coagulation commences in the tumour, and the extent of this process varies according to the form, size, and position of the aneurysm. In some cases the tumour, however small, is found completely filled up with a mass of coagulum, whilst in other cases the parietes of the artery have derived comparatively little additional thickness.

The coagulum, however, in aneurysmal tumours, is not produced quickly, being, on the contrary, a very slow process, and consisting in the formation of one lamina upon another; thus fortifying the parietes of the tumour, so as to prevent its bursting. In cases where the cavity is completely filled, an absolute cure of the disease is accomplished, the diseased portion of the vessel being rendered no longer liable to rupture. There is, however, a difference to be observed between the coagulum of an aneurysm and a common clot of blood, though the distinction has not been clearly pointed out by pathologists. But the observations I have to make on this subject will be more appropriately introduced when considering the pathology of aneurysm.

Want of Coagulating Power in the Blood.

This quality of coagulation in the blood, which, as I have endeavoured to show, is so powerful an agent in arresting hemorrhage as well as other restorative processes, has in some persons been found wanting, and thus bleedings even from very small vessels have not been capable of being stopped, and the hemorrhage has in some instances even proved fatal. As few such cases are recorded in medical works, it may be expedient on this occasion to bring before you all the materials I have been able to collect on this interesting subject, and mention those instances of this peculiarity of blood which have come more immediately within my own knowledge.

Case.—A gentleman found on several occasions great difficulty, and it often required many hours, before he could stop the bleeding occasioned by superficial scratches, such as he sometimes met with in shaving. At last he accidentally received a slight wound on one of his fingers, and every effort to arrest the hemorrhage failing, he expired.

Case.—An interesting case which I conceive to have been of the same description, is recorded by Mr. Blagden in the eighth volume of the Transactions of the Medical and Surgical Society, of a young man, who, at different periods of his life, experienced great difficulty in getting stopped the bleeding from any very slight wound. At length he had a tooth extracted, which was followed by so violent a hemorrhage, which neither styptics, pressure, the actual cautery, nor a ligature on the carotid artery, could control, and the patient died a week after the operation.

Case.—I attended a patient where the introduction of a common seton needle in the side was followed by a fatal hemorrhage. A gentleman who had an enlarged spleen, was advised to have a seton introduced in the side, and this was done in the usual manner by Sir Astley Cooper. Alarmed by the quantity of blood oozing from the wound, I was sent for to see the patient in the evening of the same day. On withdrawing the cord, pressure carefully applied with graduated compresses did not avail, and the hemorrhage being so profuse as to make it appear probable that some vessel of considerable size had been wounded, I thought it expedient to divide that portion of integument between the two perforations of the seton needle. Having done this, I then found that the blood issued from numerous orifices, and I secured no less than nine vessels with ligatures. Blood continued, however, to ooze from numberless small orifices over the whole surface of the wound, which every mode of treatment usually employed failed in arresting, and the patient died in a few days.

Case.— Mr. Wilson, in his work *On the Vascular System*, mentions a case where a child died from the bleeding of a small bite on the tongue. He states, "I once had an opportunity of inspecting the body of a young person in whom, during life, a very small degree of pressure on any part of the skin, used to produce the appearance called black and blue to that degree, that the nurse in dressing him, although a very careful woman, frequently left the impression of her fingers on different parts of his body. I have frequently seen the child with bruises of a livid colour, arising from falls, or even pressing against anything with the slightest force; if a pin happened to scratch him, a great difficulty occurred in stopping the bleeding, and the application of a single leech was productive of so much danger from the continuance of the hemorrhage, that the child's life was nearly lost. The complexion of the child was fair, and the appearance delicate, but not unhealthy; the pulse was full, but never hard, and the functions of the viscera generally seemed to go on as in other children. When between three and four years of age, the child bit its tongue; there was an impression of the teeth both on the upper and lower surface, but not very deep; the bleeding from the wounds continued for some hours, and having resisted all attempts to stop it, I was requested to see the child. I tried compression and every kind of styptic, which produced a temporary, but no permanent effect, so that although the child lived five days, and during that period I saw it several times in the day, and frequently remained an hour or two with it, though I never failed in producing a temporary stoppage of the bleeding, it was renewed almost as soon as I left the house. I included the whole of the bleeding surface in a ligature, which for a short time stopped hemorrhage, but ulceration very soon took place, and a fresh bleeding occurred; to use the needle was now impossible, as the least puncture produced a bleeding almost as violent as that from the wound. I destroyed the surface by caustic, but the eschar was soon thrown off, and the bleeding renewed; the child became very weak, and, as the bleeding occasionally occurred during sleep, was watched over very carefully; but on one occasion, when upon the supposition that he was asleep, he had not been looked at by the nurse for half an hour, she found that a very slight bleeding, not exceeding a teaspoonful, had taken place, and that the child was dead."

Case.—A curious case came within my own observation, where this deficiency in the coagulating power of the blood appeared to be *hereditary.* A family of which there are several branches, all find a particular difficulty in stopping the hemorrhage from any very slight wound they may accidentally receive, and one of the brothers who had the common operation for fistula performed, died of a bleeding which was occasioned by the incision.

Case.—But by far the most interesting case which has come within my knowledge, and where there was not only a want of power in the blood to coagulate, but where that peculiar state of the sanguineous fluid existed in many branches of the same family, occurred in the practice of Mr. Ward, surgeon, at Ewell, and I shall conclude this part of the subject by relating the circumstances as they were communicated by him to me:—

"The particular state of the boy's constitution was manifested at two months old, when his arm was unusually bruised by a slight blow; and soon after this accident, there was much difficulty in restraining the hemorrhage occasioned by a superficial wound of the lip, and since then, whenever he has had a slight scratch. When he first came under my care, he had received a superficial wound in the palm of the hand a few days previous, and appeared much exhausted from hemorrhage. I attempted to restrain it by pressure, oil of turpentine,—caustic,—and strong acetic acid; and after giving him some aperient medicine, he took the diluted sulphuric acid in large doses, and astringents. The case becoming very desperate, for the hemorrhage continued unabated for two days after I first saw him, I now ordered a dose of superacetate of lead with opium every three hours, when the hemorrhage soon abated, but whether from the effect of the medicine or not I was unable to determine. It appeared to me to have had considerable influence. I formed some idea of the extent of the hemorrhage by having the arm placed above a plate, when twelve ounces of blood was collected in as many hours. This blood was not at all coagulated, and I could only observe clots when the blood was suffered to collect in folded linen, and then in very small quantities. The boy, after this attack, was completely exsanguined, suffered excessively with all the symptoms of protracted hemorrhage, and it was several months before he recovered.

"Since that time he has been under my care for a wound on the head, the hemorrhage from which was restrained with less difficulty, because pressure could be more effectually used, and at the same time I applied the lunar caustic freely. The bandage remained for more than a week, when an ulcer, having a very offensive smell, of about the size of a shilling, remained. This went through the natural process of granulation, and certainly healed more rapidly than under common circumstances. At this time the boy is well, and is in the eighth year of his age.

"The circumstances connected with this boy's family are equally remarkable. His mother has a numerous offspring, and a brother, who is twenty-two years old, is afflicted in a similar way, and is also an almost constant sufferer with rheumatic gout. He had five uncles and two aunts; all his uncles had the same hemorrhagic tendency, three died from a division of the frænum linguæ, one from the extraction of a tooth, and the other had the same disease, but died from some other cause!

"The aunts had not that tendency in their persons; the one had three boys, two of whom are thus afflicted; the other has two boys and two girls, both boys are afflicted in the same way.

"From the above account, there can be no doubt of the *hereditary nature* of the disease; and it is a singular circumstance, that it is confined in this family to the male branches."

The treatment of such cases becomes an object of interesting inquiry, and a successful analysis of the blood might perhaps teach us how to supply the want of this power of coagulation. These substances, which disposed the blood to coagulate, seemed to have moro effect in restraining the bleeding for a time than those which excite the artery itself to contract. Hence styptic applications have been employed, which act by producing a chemical change in the blood with which they are mixed, thereby forming a cake or cement, to supply the place of a coagulum.

Sir C. SCUDAMORE has recommended with much confidence, in a work entitled *An Essay on the Blood*, the application of a saturated solution of the sulphate of alum to arrest hemorrhage. This salt, by producing an immediate coagulation of the blood, has the effect of forming a coagulum at the mouth of a bleeding vessel, and, as will be afterwards more particularly explained to you, thus accomplishes the first step in arresting bleeding. He recommends that the alum solution be warm, in which state it favours the coagulation, and this warm application is not to be considered inconsistent with the application of cold to the parts in the immediate vicinity of the bleeding vessels, the effects of which in diminishing the action of the vessels is well established. The alum solution is to be applied either by compresses wet with it, moderately pressed on the bleeding; or it may be injected into a bleeding cavity, such as the nose, uterus, bladder, or rectum.

Besides the cases to which I have alluded, wherein the want of power of coagulation in the blood seems to depend on peculiarity of constitution, and in some instances on a hereditary taint, there are some other causes which produce deficiencies in the power of the blood to coagulate.

In many diseases, where the solids are verging towards putrefaction, the disposition of the blood to form a firm coagulum is much lessened, as in typhus fever and scurvy. In animals, too, that die suddenly from over exertion, the blood does not coagulate. Most of you may be aware of the difference in the blood of a hare which has been shot, and of one which has been run down by hounds; and in persons who are suddenly killed by lightning, or violent fits of passion, or that have been hanged, the blood does not coagulate. Alkalies, and common salt, entirely prevent the coagulation of the blood, whilst mineral acids promote that process. Is it on this principle that the internal use of mineral acids is so beneficial in hemorrhages? Can this effect of sea salt on the blood, account for the state of it in persons afflicted with sea scurvy? it being well known that this complaint is the effect of eating salt provisions, and that the blood in such persons is unusually thin. We know that this complaint is also cured by the exhibition of acids. It is also a characteristic feature in the menstrual discharge, that it does not coagulate like common blood, nor does it ever become putrid, until after artificial evacuation, as is exemplified in cases of imperforate hymen, where its exit had been prevented to an advanced period of life.

Consistence of the Blood.

The consistence of the blood is another quality which deserves your attention. Blood, in inflammatory cases, is not only longer in coagulating, but it is also much thinner than natural, which thinness has been proved by HEWSON to depend on the greater attenuation of the lymph. He asserted that the blood is thinner, when in a state of inflammation, than in health, and this is apparent to the naked eye. The whole mass of inflamed blood, before coagulation, is actually thinner than the serum of the same blood is, after coagulation has taken place, and the crassamentum or clot separated from it. Hence the disposition of arteries in an inflamed part to throw out lymph, may, more or less, depend on this change in the blood. Whilst blood is flowing into the basin, our eye enables us to form some notion of its consistence, but this is best ascertained by the time it requires to coagulate. A firm texture of blood has been generally considered as a mark of a strong action in the arteries, and as pointing out the propriety of abstracting it, and, on the other hand, when its texture has been very loose, the utility of repeating venesection has been considered questionable.

The Serum.

Soon after coagulation, the mass of blood separates into two substances, the crassamentum and the serum.

The serum, or watery part, exudes through the pores of the coagulum, whilst the latter, at the same time, contracts itself, leaving the sides of the vessel containing it, but preserving its form. The coagulum, which contains the red colour, constitutes the *crassamentum.*

The proportions of the serum and crassamentum are various, but in healthy blood they are nearly in equal quantities; whereas, in very stout and laborious people, and during some inflammatory diseases, the crassamentum is in the larger proportion.

The serum is a fluid of a pale straw colour, has a slight saline taste, is somewhat viscid, and rather heavier than water, with which it mixes readily. When exposed to a moderate heat, it coagulates into a white glutinous mass, and the same effect is rapidly produced by its sudden admixture with an equal quantity of boiling water. Serum also coagulates on being mixed with the diluted sulphuric, nitric, or the muriatic acids.

The part of the serum which thus coagulates, either by the application of heat, or admixture of acids, possesses all the chemical properties of the white of egg, and has been termed the *albumen*. When serum is coagulated by heat, there oozes out from the mass a small quantity of a viscid fluid, which has been termed the *serosity*, and is a mucous fluid.

The serum has been found of a white colour, like cream, and to contain globules, which peculiar appearance has been attributed to an admixture of the chyle with the blood. This appearance, however, has usually been met with in the serum of persons whose appetite has been impaired, and who have been subject to sickness and vomiting. HEWSON supposed this change of colour to arise from absorbed fat, and states that all the persons in whom he found white serum were plethoric, and were relieved by bloodletting. If a person be bled soon after dinner, the serum appears milky.

The serum is in greater quantity in what has been called *sizy* than in healthy blood, and the greater quantity which makes its appearance when you examine a vessel containing such blood, arises from the strong contraction of the fibrin forcing all the serum out of the clot. In such blood, the coagulum is remarkable in its shape; in place of having a smooth, plain surface, its edges are inverted, and it swims in a large quantity of serum, this peculiar form being denominated "cupped."

When serum collects in a preternatural quantity, either into the cellular texture, or into any of the serous cavities, as those of the pleura, pericardium, or peritoneum, it produces the disease called *dropsy*.

The Red Globules.

HUNTER supposed that the red globules were an indication of physical strength, and that the stronger an animal was, the more red globules did its blood contain. Wild animals have a greater proportion of red globules in their blood than those which have been domesticated, and there is a curious difference in the colour of some muscles in the same animal, depending, no doubt, on the colour of the blood; this is particularly remarkable in the pectoral muscles of the black-cock, one set being much paler than the others.

The colour of the globules themselves varies in different vessels of the body, and there is a difference in shade or intensity of the colour of the blood from the quantity of globules which it contains. There are also diversities of shade of the blood in the different systems of vessels. It is of a bright scarlet colour in the arteries, and purple in the veins, and it is changed from the scarlet to the purple in passing from the ramifications of the aorta into the veins. Hence the variety of shades of red, in different inflammations, arising from the differences in the proportion of the number of arteries and veins of the inflamed part. When kept at rest, the blood in the arteries becomes of a dark colour, and extravasations of arterial blood into cavities, if not exposed to the atmospheric air, also assumes a dark colour.

Although blood is usually dark in the veins, it is not so under all circumstances. For when a large orifice has been made in a cutaneous vein, the blood which immediately follows the withdrawal of the lancet is black, but this is sometimes succeeded by blood of a florid scarlet colour.

The blood is also found of a florid colour in the veins of a part affected with common inflammation, and if the bandage used in phlebotomy has been kept some time on the arm, the blood which first flows from the orifice is very dark.

In diseases obstructing respiration, the blood is likewise of a very dark colour. This is the case during a fit of asthma. In diseases where the respiration is quick, as in phthisis, the blood is usually florid, and indeed, in inflammatory diseases generally, the blood is more florid than natural.

The red globules are not distributed, like other parts of the blood, throughout the whole frame, as appears from the want of the red colour in certain parts of the body. In some diseases their number is increased, at least in particular parts, and this may alone depend on the change in the size of the containing vessels. When much blood has been taken from the body, the red globules are not so soon renewed as its other parts, hence the paleness which often exists for a long time after copious depletions.

Mr. BRANDE has found, that the menstrual flux in its component parts resembles a very concentrated solution of colouring matter in a diluted serum.

Changes are also observed in the colour of the external or cutaneous bloodvessels in many diseases, which informs us that changes must have taken place in the sanguineous fluid. Observe the varieties of red in the colour of the lips and cheeks, in the eyes, and in the skin covering diseased parts. Observe the various changes of the kind of redness in the skin around different ulcers—changes which alone, in many instances, tell us the nature of the disease!

RICHERAND amputated the arm of a very old man, who for thirty years had an ulcer on his arm, which was connected with a varicose state of the veins, and the health of this individual was much impaired. During the operation it was observed, that the blood as it flowed from the arteries was much less red than that which was lost by a young man whose leg was taken off on the same day. In fact, the venous blood appeared as if dissolved, of a violet colour, or somewhat like that produced by log-wood; neither did it coagulate like that of the young patient; it separated into a serous fluid, containing a few clots very little coloured.

The Coagulable Lymph.

The coagulable lymph, *gluten*, or *fibrin*, is that part of the blood which, as has already been mentioned, forms with the red globules the *crassamentum* or clot.

When the crassamentum is deprived of its red globules, which may be readily done by allowing a small stream of water to pass upon it, and by squeezing out the serum, what remains is the coagulable lymph, in the form of a white, tough, elastic mass, having a fibrous appearance, even in some instances apparently formed into laminæ.

It is this ingredient of the blood which renders it susceptible of coagulation, when removed from the living body, both in certain healthy and diseased processes,—a change, whether we regard its rapidity, its degree, or its various modifications, which forms an important diagnostic character in particular diseases. Mr. DOWLER, in his ingenious paper, observed, that when inflammation takes place accompanied with effusion, the first substance that escapes is serum,—but if the inflammatory action increases, then *fibrin* is effused, and the inflammation still increasing, pus is formed.

While the blood is in a fluid state, the coagulable lymph cannot be separated from the serum, but in disease this separation often takes place. Hence coagulable lymph is effused on the surfaces of inflamed membranes, or into cavities, such as those of the pleura and peritoneum; whilst in other diseases, the serum is separated from the blood, and collected in cavities, forming the different kinds of dropsies.

The coagulable lymph is found in the greatest quantity in the blood of those afflicted with inflammatory affections of the fibrous textures, particularly rheumatism.

There is a very considerable difference to be sometimes observed in the quantity of the coagulable lymph in blood taken in different cups from the same patient at the same bleeding. In some instances this difference has been observed nearly one-half. The coagulable lymph of healthy blood is more firm than that of sizy blood.

The Buffy Coat.

Whilst the blood is coagulating, the process of coagulation takes place in healthy blood so quickly, that the red globules are diffused throughout the whole of the crassamentum. But this is not the case in many diseases wherein the coagulation occurring more slowly, the red globules, being from their greater specific gravity separated from the coagulable lymph, are found disentangled at the bottom of the vessel. In some cases the coagulation takes place before the red globules have scarcely reached below the surface of the crassamentum; and this portion, deprived of red globules, forms what is called the "buffy coat." The appearance of a buffy coat is generally described as one of the most striking characters of the inflammatory diathesis. A buffy coat, however, is not to be considered, either as a certain test of inflammation, nor is it a safe index of the propriety of bloodletting. Whilst inflammatory diseases are at their acme, there is often no appearance of the buffy coat in blood taken from a vein; but in the latter stage of inflammatory disease, and when blood can no longer with propriety be abstracted, the buffy coat becomes remarkable. In local inflammation, before the constitution appears much influenced, the blood which is drawn from the larger vessels of the inflamed part, has been found to form a buffy coat, whilst blood drawn from distant vessels does not show the same disposition.

In the advanced stages of pregnancy it has often been observed, that the blood has a peculiar disposition to form a buffy coat. The buffy coat or "inflammatory crust," as it is likewise called, is of very different degrees of thickness, and the time required for its production varies from a few minutes to upwards of half an hour.

Dr. TWEEDIE once saw the buffy coat in blood taken from the temporal artery of a person labouring under pneumonia, and the great prevalence of the buffy coat in diabetes first led Dr. WATT of Glasgow to treat that disease by frequent bleedings. The state of the blood, more particularly however as it regards the buffy coat, is by no means to be considered, as has already been observed, as a certain indication for the employment of bloodletting.

Dr. HAMILTON has observed, in his work *On the Use and Abuse of Mercurial Medicines*, that blood drawn from the arm of the most delicate and debilitated individual, subjected to a course of mercury, exhibits the same buffy coat as blood drawn from a person labouring under pleurisy.

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LECTURES ON SURGERY,

DELIVERED BY

MR. WARDROP.

THE DISEASES OF THE SANGUINEOUS SYSTEM.

Of the Abstraction of Blood.— General Observations on the Utility of Bleeding.—Difference in the Effects of abstracting Arterial and Venous Blood.—Of a local Abstraction of Blood.—Effects of Bleeding from Incisions made in inflamed Parts.—Spontaneous Bleedings from Wounds—Local Bleeding, and when to be employed.

On the Abstraction of Blood.

THE abstraction of blood from the body is one of the most powerful of therapeutic means. I shall therefore make no apology for directing your attention in a particular manner to this subject, being persuaded that if it be now fully explained, much repetition of particular diseases will be saved. At the same time I will endeavour to point out some general rules as regards the symptoms which indicate the propriety of bleeding, the quantity of blood which ought to be taken, and the comparative advantages of each mode of abstracting blood, which I hope you will find useful in the practice of your profession.

I may remark, that the observations which I am about to make on this subject are to be considered chiefly as the result of my own experience in a great variety of diseases amongst the different classes of society; for you should be aware, that diseases assume an almost infinite variety of form amongst different ranks of the community. This ought always to caution you against attempting to draw general conclusions from examples of diseases which occur only amongst a particular class of persons. Those who may have been in the habit of seeing diseases chiefly amongst the peasantry, or in the army, or in the navy, will be much struck with the various shades which the same complaints present in this metropolis, where you will meet with patients whose constitutions have suffered from indulgence in all the vices, and from all the mental excitement to which man is exposed amid this vast concourse of human beings.

A more fit opportunity may not, perhaps, occur than the present, to impress on your minds the importance of carefully watching the effects of the same remedy in different examples of the same disease, and to point out to you in what manner diseases are modified by the various circumstances and relations of each individual case.

No two examples of disease are ever met with which are precisely the same in all respects, and though they may resemble each other in many essential points, still they will be found to differ in every individual, either according to the period which the disease has existed, the age, the sex, the temperament of the patient, or according to some other circumstance which demands consideration in the treatment, and which ought more or less to modify that treatment. This observation applies in a particular manner to those diseases for which medicine possesses what is usually called a "specific" remedy. In treating all these diseases, everything depends on the state of general health in the individual before such specific medicines are administered. From want of this care how often do we hear of the different preparations of mercury, bark, and iron, disagreeing with particular patients! In almost every instance this will be found to arise from the alimentary canal being in a deranged state, which state ought to have been corrected previous to administering the specific remedy. The most useful medicines often fall into disrepute from want of such attention, whilst in other instances the dose must be changed, as well as the form of administering it. I do not mean to affirm that there are no individuals with whom particular medicines disagree. On the contrary, there are persons in whom bark, mercury, iron, and even milder drugs, have a decidedly pernicious effect. Such instances, however, are only to be considered as exceptions.

Diseases, I have already remarked, assume an infinite variety of character, not only in persons of different ages and constitutions, but also in people living in different districts of a country, and in different ranks of society. The limited observations, therefore, which are made on the treatment of patients in the wards of an hospital, have often had, from persons who have afterwards applied them to other classes of the community, the imputation of being incorrect. I have often heard medical men, whose practice has been confined to a particular class of persons, such as soldiers or sailors, and who have acquired great expertness and skill in treating that particular class—I have often heard such practitioners remark, how different were the plans which they found it necessary to pursue when they were called on to treat the diseases of other classes of individuals, particularly those of women and children, and such of the poor as are habituated to intemperance, and acquire artificial habits of life.

I cannot dwell too strongly on the importance of this subject, as I think it may be distinctly traced that many errors in the treatment of diseases, have arisen from one set of practitioners being accustomed to act with greater energy than is necessary, and following indiscriminately a particular system, and another set who, from seldom seeing the more violent forms of disease, practise with temerity and indecision.

These observations, while they may be applied to the use of any remedy, are yet particularly applicable to that now under consideration, as there is no means more generally used, and more decided in its effects, than the abstraction of blood, and yet there is no point on which you will find greater diversity of opinion as regards the circumstances and extent to which it should be employed. The practical errors to which I have now alluded, can only be corrected by a nice discrimination in individual cases, and the power of thus discriminating can only be acquired by being in the constant observation of diseases amongst all classes of the community, and seeing every description of disorder, more especially at an early period of the practitioner's life,—when the perceptive powers are most acute, and the mind has not yet been fettered by theoretical and hypothetical doctrines. Such a habit of observing diseases in the living body, and also a familiar acquaintance with the appearances of diseased structure, will lead certainly to a comprehensive knowledge of medicine, and to a quick discrimination of the peculiarities of each individual case. The art of diagnostics, whilst it is indeed the most difficult, is certainly the most essential branch of pathology.

Differences in the Effects of abstracting Arterial and Venous Blood.

The abstraction of blood is employed as a remedial means, either for the purpose of diminishing the action of the heart and arteries in inflammatory diseases, or for the removal of a surplus quantity of the sanguineous fluid, whether venous or arterial, in particular organs wherein there is what has been called "plethora," or a congestion of that fluid. A quantity of blood may also be abstracted in some diseases where the qualities of the body have become changed; but whatever explanation may be given of the effects of blood-letting, there is no doubt of its multiplied results in the treatment of disease, whether the fluid be removed from the system by art, or by a "spontaneous hemorrhage."

Blood may be abstracted either from the *venous* or from the *arterial system*, but I am not aware, that much attention has been paid to distinguish the difference of the effects which are produced on the system, by taking blood from an artery and from a vein, though it can readily be conceived that such difference may be considerable. The chief reason which is usually given for opening arteries in preference to veins, has been that the blood may be obtained more directly from a particular part, and in larger quantity, and more promptly, than it would be by opening a vein. But as almost the only vessel on which arteriotomy has been performed is the temporal artery, we know little of the effects of abstracting arterial blood, except when it has been taken from that vessel. The result of my own experience has been unfavourable to arteriotomy; having found that the inflammatory symptoms recur much more frequently after a certain quantity of blood has been removed from an artery, than if an equal quantity had been taken from a vein in the arm; and I know that this observation coincides with the experience of some others.

There are, however, cases where the difficulty or even impossibility of procuring the requisite quantity of blood from a vein, renders arteriotomy an indispensable and important operation for the abstraction of blood.

A little reflection on these two modes of bleeding, may to a certain degree explain how this difference of effect is produced.

When blood is abstracted from an artery, there must be an immediate diminution in the supply of blood to the part nourished by that artery; but such is the vigour of the anastomosing branches, that the supply of blood thus cut off is very quickly restored. It is not so if a vein be opened, for it does not necessarily follow that the *arteries* of a part increase in activity, in order to supply the blood abstracted from the *vein*. Both these facts are confirmed by observation. If one of the carotid arteries be tied, almost immediately the temporal and occipital branches of the carotid of the opposite side may be distinguished through the integuments, dilating themselves, becoming tortuous, and struggling, as it were, to circulate an additional quantity of blood.

I was first led to remark this in the case of a child, on whose carotid artery I had placed a ligature for the cure of a large nævus on the cheek. Almost immediately after the operation, I observed the arteries from the opposite side of the head enlarging, increasing in their action, becoming tortuous, and actively employed in supplying the place of those vessels whose channels had been obstructed. Indeed, it was the knowledge of this power in the anastomosing branches, when a trunk is obliterated, that led Hunter to perform the "high operation," as it is called, for popliteal aneurism. The same phenomenon is exhibited in the eye. If an artery on the sclerotic conjunctiva, passing into a speck on the cornea, be divided, immediately vessels will be perceived, stretching across the cornea from the opposite side, to supply the place of the vessel which was divided.

The whole arterial system, by a wise provision of nature, whenever the supply of blood to one part is diminished, makes an effort to throw blood by another to the part which has been deprived of its natural quantity, and thus the action of the heart and arteries must be more or less injured; whereas the abstraction of blood from a vein is followed by no such increased action of the arterial system,—there is no local diminution in the supply of arterial blood,—no effort made by the arteries to supply the place of the venous blood which has been removed. On the contrary, a diminution in the supply of blood to the heart by the veins will, as I have just observed, have the effect of diminishing the vigour of the heart's action, and also that of all the arterial system.

The effects of opening the temporal artery in puriform ophthalmia may be instanced, as well illustrating the difference between arterial and venous depletion for the cure of inflammation. An eye injected with red vessels, will be suddenly relieved by opening the temporal artery, and the conjunctiva will become quite pale, inducing one to suppose, that the inflammation is subdued. But I have generally found, that sooner or later, even in a few hours, the inflammation has returned, and I think others, particularly Dr. Veitch, have made the same remark. Whereas, when, in that disease, a vein in the arm is opened, and blood is taken to the full extent, the good effects of such depletion are permanent.

This is, therefore, a distinct and important difference between the changes which take place in the action of the vessels of a part, when blood has been taken from an artery and from a vein, and it explains the difference which I have always found in the employment of those two different modes of abstracting blood. It is also extremely probable, that there must be a difference of effect from the kind of blood which is taken away,—that the removal of a pint of arterial blood will produce a different effect on the system from the removal of the same quantity of venous blood. What these differences are I do not pretend to know, but one proof that the abstraction of venous blood is the most useful in the cure of disease is, that in those natural or "spontaneous hemorrhages" which are so salutary, such as those from the nose and hemorrhoidal vessels, the blood which is discharged appears to be chiefly venous. Where leeches and cupping are had recourse to, it no doubt happens that they remove both arterial and venous blood at the same time; but the circumstances under which those operations are performed, do not furnish us with any opportunity of discriminating the comparative effects of the abstraction of venous and arterial blood. Another point which you ought to hear in mind is, that the temporal arteries as they pass over the zygoma of the temporal bone, can only be once opened at the proper point for the operation. For arteriotomy is not like venesection,—the wound made in the vein uniting, and leaving the canal of the vessel entire; whereas when an artery is opened, it is requisite, after taking the necessary quantity of blood by the wound, to divide it completely in order to allow it to retract, that the blood may be stopped, for, as shall be afterwards shown, it is improper to attempt to do this by compression alone. The canal of the artery becomes, therefore, by the operation of arteriotomy, completely obliterated, and as the circulation is afterwards carried on by a greater or less number of enlarged branches, neither the original trunk nor a branch of sufficient caliber will be found in the temporal region, on which the operation of arteriotomy could be repeated, should such a measure be deemed necessary.

Of the Local Abstraction of Blood.

There is no question which you will more frequently have to ask yourselves, when treating particular cases of inflammatory disease, than that of whether *general* or *local* bleeding ought to be employed, and, as far as I know, this most important practical question has not been explicitly answered, nor have such distinct rules been laid down by any author, as will serve to guide the young practitioner; though the practice of different judicious men on this, as in most other practical points, will be found nearly to correspond. Now it appears to me, that there are certain indications which will, on all occasions, enable you to employ, in the most decided manner, the one or the other of these modes of abstracting blood; but before endeavouring to point out what those indications are, it will be necessary to explain what is usually understood by *general* and *local* bleeding. It has been already mentioned, that cupping, scarifying, and the application of leeches, are considered as *local* bleeding, whilst venesection and arteriotomy are employed for *general* bloodletting.

But there are few parts of the body from which blood can he abstracted locally, strictly speaking; for blood taken by leeches or cupping from the integuments covering a diseased organ, often comes from vessels which are not ramifications of, and have no direct communication with, the vessels of the diseased organ,—the superficial and deep-seated vessels, both arteries and veins being, in most parts of the body, branches from other trunks. Thus, blood taken from any of the branches of the external carotid, as the temporal arteries in the treatment of the diseases of the encephalon, cannot be considered as local bleeding, from the distant and circuitous connexion those vessels have with the internal carotids. Neither, for like reasons, can blood, taken from the parietes of the chest or abdomen, be considered as strictly local bleeding in affections of the thoracic or abdominal viscera. The opening of a vein in the arm, abstracts hlood more directly from the jugular veins, and, hence, from the encephalon, as well as the superior and inferior cavæ, than does leeching or cupping the integuments of the temples, forehead, or those of the thorax or abdomen. General bleeding, as it is commonly considered, is, therefore, a more local mode of taking away blood in the treatment of the various affections of the brain and of the thoracic and abdominal viscera, than that usually resorted to, and commonly considered, as local bloodletting.

Local or "topical" bleeding, as it is called, can, indeed, be employed only on a few organs, or in a few parts of the body. In the treatment of diseases within the cranium, topical bleeding can be accomplished by taking blood from the "ethmoidal vessels," or from the "frontal vessels," both of which come from the encephalon; or it may be taken from the vessels behind the mastoid process of the temporal bone, the veins communicating directly with the lateral sinus. As the frontal artery is a ramification of the ophthalmic, and as the ophthalmic artery comes from the internal carotid, and passes through the orbit to reach the forehead, blood taken from that vessel must be, strictly speaking, a more local bleeding in diseases of the head and globe of the eye, than blood taken from the temporal artery—the temporal artery being a branch of the external carotid.

On this account, in diseases of the head, as well as in diseases of the eye, more particularly those affecting the internal parts of the globe, leeches applied over the frontal vessels, give much more relief than can be obtained by abstracting an equal quantity of blood from the temporal vessels, by leeches applied to the temples.

Bleeding from the nose, or epistaxis, may also be considered as a local bleeding in diseases of the encephalon, for in such cases the blood comes from the ethmoidal vessels, which are branches of the internal carotids, passing through the cribriform plate of the ethmoid bone, and ramifying on the Schneiderian membrane. I have known cases of affections of the head, which, after resisting general bleeding, and the application of leeches on the head, were instantly relieved by the escape of even a few drops of blood from the nose. The effect of losing a small quantity of blood locally, is, indeed, often surprising. Of this I might give some remarkable illustrations.

Case.—An instance of the kind to which I allude, occurred in a lady, who, after employing local and general bleeding for a disorder in her head, applied to a quack doctor, celebrated for curing headachs. He introduced an instrument into the nose, by which he wounded the Schneiderian membrane, and produced a flow of blood; and the evacuation which followed instantly, completely cured the headachs. It was in a case of this kind that Galen acquired much renown, by prognosticating that the person would have a flow of blood from the nose, by which the affection of the head would be relieved.

I have often thought that some mode might be contrived, by which an artificial flow of blood from the ethmoidal vessels could be produced, as there are, no doubt, many affections of the head which would be relieved by such an operation. Or leeches might be safely applied to the interior of the nostril.

Case.—A lady who had suffered long from headachs, was advised to apply leeches within on the membrane of the nostril. One was accordingly applied within each, and her headachs were completely relieved.

Leeches applied behind the ears are also found to relieve affections of the head; but I was unacquainted with the physiological explanation of this practical fact, until Mr. Quain observed, that the beneficial effects could satisfactorily be accounted for by the vascular communication of the integuments behind the ear with the encephalon, which has already been alluded to.

Immediately behind the mastoid process, and near where the temporal and parietal bones unite, is situated the mastoid foramen, through which sometimes an artery, and always a large vein, passes, which vein comes directly from the lateral sinus. It is, therefore, easy to explain how substantial relief should be obtained in those affections of the encephalon where depletion is necessary, by the application of leeches behind the ears, and it is often astonishing how copiously blood is abstracted from this part of the head, which has long induced me to employ this mode of bleeding very extensively.

"Scarifying" the conjunctiva, or applying leeches thereon in the treatment of some forms of ophthalmia, is also a useful means of abstracting blood locally, the good effects of which, when other modes of depletion have been employed, are very striking.

Leeches also, applied to inflamed gums, give great relief, and so also do leeches applied to the mucous membrane of the vagina in cases of inflammation of the uterine organs. Bleeding in the jugular veins is also a most useful operation in affections of the head, particularly in children, where leeches applied to the neck are often dangerous, and where the veins of the arm cannot be opened.

I formerly had occasion to remark, that the most powerful means we possessed for the treatment of diseases, produced their good effects by imitating the process which nature herself employs, and in no class of cases is the *vis medicatrix naturæ* more admirably exemplified, than in the benefit derivable from "spontaneous hemorrhages," or the propriety of local bleeding more distinctly pointed out. Indeed it is extremely probable that artificial bleeding was first suggested for the cure of diseases, by the beneficial effects observed to arise from spontaneous hemorrhages.

The effects of local bleeding from the hemorrhoidal vessels, is exemplified in *hemorrhoidal tumours*, many persons being in the habit of losing, and that sometimes at regular periods, a considerable quantity of blood from those tumours,—a circumstance which seldom fails to relieve some disturbance of the general health arising from congestion in the portal system. Hence the practice not only of promoting such a discharge in those who may have been habituated to it, and the dangerous consequences which its suppression has so often been known to produce, but the propriety it pointed out of local bleeding when either the hemorrhage is not sufficient to remove the symptoms, or when such symptoms at any time come on, and are not followed by the spontaneous evacuation of blood.

Blood is also discharged sometimes by the bursting of varicose veins, which is equally efficacious in relieving internal diseases, and Petit and others have recorded cases where such hemorrhages have taken place to an enormous extent.

Even in *malignant diseases*, such as cancer and fungus hæmatodes, the occasional hemorrhage from such tumours, whilst it may be sometimes too profuse, often has a salutary effect, and relieves the fulness of the vessels, and the pain which frequently accompany these diseases. Hence the decided benefit which I have often found arise from the occasional application of leeches to the adjacent parts, when there was any accession of pain or tension.

The same extraordinary relief may also be observed from hemorrhages in *sloughing ulcers*, the discharge of blood subduing that excess of violent inflammation which led to the sloughing of the soft parts. It was by observing the effect of hemorrhages in cases of this description, that I was first led to adopt what I have since found a most useful practice in sloughing sores,—that of abstracting blood artificially, not only in order to arrest the local bleeding, but to subdue that inflammatory condition of the system which leads to the sloughing process.

Effects of Bleeding from Incisions made in Inflamed parts.

The beneficial effects of local bleeding may also be observed when it becomes necessary to make an incision into an inflamed part. It is by no means unfrequent to find, that extraordinary relief is produced by the blood which flows from an incision made through the inflamed integuments covering an abscess, and that too under circumstances where the accompanying symptoms would not have indicated the propriety of abstracting blood in any other way.

Case.—A remarkable illustration of the good effects of a local bleeding of this description I witnessed in a medical student who was under the care of Mr. LAWRENCE and Mr. EARLE, who had a most extensive and severe inflammation of the hand and arm arising from a poisoned wound of the finger, received when opening a putrid body. He had been bled copiously, until the pulse had completely sunk; but still there was so much swelling, redness, and pain, in the arm, that Mr. LAWRENCE was led to adopt a treatment first proposed by Mr. HUTCHINSON in erysipelas, and strenuously advocated by Mr. HUTCHINSON in his *Surgical Observations*. The practice consists in making deep and extensive incisions through the inflamed integuments. This was done in the above case, and several pounds of blood were discharged from the wounds, which, in place of weakening the patient, as might have been expected, was followed by rapid abatement of all the symptoms, and certainly seemed to be the means of saving life.

The common practice of laying open sinuses while the adjacent parts are in a state of inflammation, owes its good effects entirely to the profuse bleeding which generally follows the incision.

Similar good effects may be daily observed from the flow of blood which takes place when free incisions are made through the inflamed integuments of the finger in whitlows, and by dividing the gums during dentition. Independent of this relief from the bleeding, why should we not anticipate as much relief from the discharge of the serum, or sero-coagulable effusion, into the cellular tissue of an inflamed part, as from the discharge of the effusion when it has become purulent? It seems to me a point well worthy of consideration, whether or not in phlegmonous cases it would not be much more advantageous—in many instances of inflammation where there is no rational expectation of preventing suppuration—to make a free incision through the inflamed skin at an early period, and before any pus has been formed. The evacuation of the sero-coagulable fluid effused in the cellular tissue, and deposited there previous to its conversion into purulent fluid, along with the profuse discharge of blood from the incision made in the integument, would produce not only great relief from pain, but would limit and check the future progress of the inflammation.

Case.—A girl, about ten years of age, had a large inflammatory swelling on the ulnar aspect of the arm, which was extremely hard and painful to the touch, and the integuments were of a bright-scarlet colour. Though I could not distinguish any fluctuation, I was persuaded that by freely dividing the skin she must be saved a protracted suffering. I therefore made a free incision through the middle of the tumour. It bled most profusely, and I could not detect the escape of any purulent fluid with the blood. A poultice was applied, the inflammation and pain were almost immediately subdued, and the wound granulated and healed with great quickness.

The Spontaneous Bleedings from Wounds.

In many cases I have witnessed the beneficial effects of local bleeding which takes place after operations, and to avert or arrest which care is usually, though injudiciously, taken. When speaking of surgical operations, I had occasion to point out the good effects which the loss of even very considerable quantities of blood during operations often has in preventing the subsequent febrile symptoms and local inflammations. But it may be here noticed, that whatever quantity has been lost during an operation—however carefully the patient has been prepared before the operation—however careful the surgeon may have been in securing with a ligature every bleeding vessel, yet, more or less, inflammatory action, accompanied by fever, may supervene, and a hemorrhage from the wound may take place. Under such circumstances little need be feared from the bleeding; and before placing a ligature on the bleeding vessel, it will be wise either to have the wound exposed, and to allow a sufficient oozing to check the inflammation and the accompanying febrile symptoms, or to take some blood from a vein in the arm for the same purpose.

On a former occasion I alluded to a case where I removed the greater portion of the lower jaw of a young woman who was so deluged in blood that by-standers conceived her recovery to be almost impossible. She remained many hours in a state of syncope, but I avoided giving her any stimulants, in the hope that the fearful wound would be more likely to heal by adhesion. But notwithstanding all precautions, in a few days she became hot and feverish, and blood issued from a corner of the wound. I used no means to arrest it, and it stopped after a few ounces were discharged, completely alleviating all the inflammatory symptoms.

Whenever, therefore, there is any chance of bleeding from a wound, it is of great importance not to be too hasty in dressing it by applying plasters and bandages, so that if any bleeding takes place, all the pain and alarm of undressing the wound are avoided, and the bleeding vessel can be easily secured.

Local Bleeding; when to be employed.

These observations are sufficient to point out the advantages which are to be derived from local bleeding, strictly so called. In the treatment of those diseases wherein bleeding is to be employed, it is of great consequence to have impressed on your minds some rules to enable you on all occasions to decide whether to make choice of local or general bloodletting. Now you will find it an excellent rule, and one which I will venture to say will seldom lead you into error, always to employ general in preference to local bloodletting, in such cases of local disease or injury as are attended with, or have created, a disturbance of the general system. Local bleeding, on the other hand, ought to be employed in preference to general bleeding, when local symptoms only exist, or when local symptoms only remain, the general symptoms having been subdued by previous general bleeding. A person, for instance, receives a blow upon the head, which creates a good deal of symptomatic fever. He is bled more or less profusely at the arm, and until the febrile symptoms are subdued. A good deal of inflammation of the integuments, however, still continues, to remove which leeches may be judiciously applied. The same observation may be made in the treatment of almost every injury or disease in which bleeding is necessary. Perhaps the most frequent error which is fallen into in the treatment of those diseases which require bloodletting, is, that local bleeding is employed where general bleeding or venesection ought to have been substituted. It is seldom that the reverse practice has been adopted, or that a patient has been copiously bled at the arm, in place of losing blood by leeches or cupping. There seems always a disposition, both in patients and in medical men, to economise blood, venesection being commonly considered a much more serious operation than cupping, or the application of leeches. Hence, one of the latter, though often injudiciously, is generally preferred. Hence, in many instances of persons who have repeatedly lost blood, an error has been committed in commencing with local in place of general bleeding, the consequence of which is, that the disease is not so soon checked as if a more copious general bleeding had been employed in the first instance; and, moreover, by the necessity of resorting to a frequent repetition of local or general bleeding afterwards, the whole quantity abstracted greatly exceeds what would have been required had the treatment commenced with an adequate venesection.

In the next lecture I shall consider the subject of *general bloodletting*, and endeavour to point out the symptoms which indicate its use, the quantity of blood to be abstracted, and its utility in the cure of diseases.

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LECTURES ON SURGERY,

DELIVERED BY

MR. WARDROP.

OF THE SANGUINEOUS SYSTEM.

ABSTRACTION OF BLOOD.

Indications for employing General Blood-letting.—Of the Pulse;—An incompressible Pulse; — Other Changes in the Pulse;—Natural Varieties of the Pulse.—Changes in the Heart's Action;—The Local Pain.—Importance of the first Bleeding;—Extent to which it should be carried.—Effects of Syncope.—Quantity of Blood to be abstracted.

Indications for the Employment of General Blood-letting.

Having endeavoured to point out the different modes by which blood may be abstracted *locally*, and having illustrated the salutary effects of local depletion by references to the phenomena of spontaneous hemorrhages, and various local inflammatory affections, as well as congestions of blood, which are not accompanied by any constitutional disturbance, I now come to consider the subject of general blood-letting, the indications which point out the propriety of employing it, and the quantity of blood which should be removed in the treatment of various diseases.

It was remarked in the last discourse, that whenever any local disease or injury has excited a febrile disturbance throughout the system, general bleeding or venesection ought then to be decidedly preferred to local bleeding, and the indications to which your attention ought more especially to be directed in deciding on the propriety of general blood-letting, are, the state of the heart and arteries, and the character of the local pain.

The leading symptom by which the constitutional disturbance demanding venesection is indicated, will be found in the *quality of the pulse;* and in deciding on the propriety of blood-letting, it is not always necessary that you should find the pulse frequent, or tense, or full, or hard, but you ought on all occasions to be satisfied of the propriety of abstracting blood from a vein, whenever, in any complaint of an inflammatory type, or under circumstances such as those which often arise after operations, or from accidents, there is the least deviation in the pulse from the natural state. No sooner have a few ounces of blood been abstracted in cases of this kind, when the pulse will be observed to "rise," as it is called, and to acquire volume and power, thus indicating the propriety of the measure.

There is nothing more uncertain than trusting to those qualities of the pulse which are usually described as such which alone indicate the propriety of blood-letting, and you ought ever to be aware of the important fact, that, during an attack of inflammation, the pulse varies with the organ affected, and is even different in inflammatory affections of different textures of the same organ, except in one particular indication, which shall be presently pointed out.

The mere frequency of the pulse is a circumstance of little importance in estimating the propriety of blood-letting compared with changes in its qualities, and, therefore, the usual practice of counting with great accuracy the number of pulsations, is apt to lead to the formation of an erroneous judgment. In two patients, whose pulse beats 120 in a minute, the one may require to be plentifully bled, and the other to have cordials!

Little difficulty occurs in distinguishing those states of the system which require general bleeding when diseases have far advanced, or have made considerable progress, and when their symptoms and character have become distinctly developed.

It is before they arrive at this period, and when, too, medical treatment is most available, that their true nature is apt to escape detection, and there are many states of disease where substantial advantage is to be derived from venesection, and where, at the same time, it could not, perhaps, be affirmed, from the presence of any particular symptom, that inflammation did actually exist. "Inflammation in some textures of the body," observes an intelligent writer, "is so obscure in the beginning, so insidious in its progress, and so rapid in its termination, that in all cases in which the surgeon hesitates respecting the necessity of bleeding, it is a wise plan not to deprive the patient of the benefit of the doubt, but immediately to proceed to venesection."

It is also certain that there is a period of disease, when bleeding is not only unnecessary but improper; and there is a moment when venesection may be had recourse to with more advantage than at any other. To detect this precise period must, therefore, be of great practical importance. In those who have been wounded, or who have met with some severe accident, or on whom an operation has been performed,—in all such cases the action of the heart and arteries, which is at first diminished by the general shock received by the whole system, should be allowed to recover, or reaction should take place before resorting to blood-letting, and this rule applies generally to all inflammatory diseases. The chill, for instance, which a person receives from sudden exposure to a change of temperature, and which lays the foundation of an inflammation in some of the internal viscera, produces a collapse of the whole frame, which is not followed until after a certain period, by those inflammatory symptoms which require the blood-letting.

An Incompressible Pulse.—The peculiar feeling in the pulse to which I have alluded, and which you will find points out, almost universally, the propriety of venesection, has been called, and sufficiently well indicated, by the term "incompressibility." An incompressible state of the pulse may, I venture to say, be considered as pathognomic of inflammation, in whatever organ or texture that inflammation exist. I have already remarked, that the different textures of an organ when inflamed, are each attended with some peculiarity of the pulse. Inflammation of the dura mater,—of the cerebral pulp,—of the pleura,—of the mucous membrane of the bronchi,—of the pericardium,—of the muscular parietes of the heart,—of the serous membrane which lines its cavities,—of the peritoneal and of the mucous coats of the intestinal canal,—are each accompanied by peculiarities of pulse; but in all you will be able to detect an incompressibility. For whether the pulse be full or small, hard or soft, frequent or slow, if with the point of one finger the artery be pressed at the wrist, you will perceive with another finger applied to the artery beyond the first finger, that unless a very considerable degree of pressure be employed, the pulsation will not be entirely destroyed, but the sensation, as if of a fine thread, or hair, will remain.

The incompressible state of the pulse as indicative of the propriety of blood-letting, is illustrated in some of the subsequent cases; and you may also observe instances of persons being relieved from internal disease by profuse and spontaneous hemorrhage, and in whom no deviation in the pulse, from its natural state, could be detected, except as regards this feeling of incompressibility.

Attention to this quality of pulse has scarcely ever failed to guide me, in the use of phlebotomy, even in doubtful circumstances, and a conviction of the accuracy of the observation led me to adopt bleeding in many cases, where I could not otherwise have ventured to employ it, and where there were not present any of the ordinary indications of inflammatory action. It was this state of pulse which first gave me confidence in employing venesection in erysipelas, in cases of sloughing ulcers, in exanthematous fevers, in cases of poisoned wounds, in specific diseases, and in certain stages of several other affections afterwards to be considered, and where an opposite practice is frequently nay usually followed.

In most of the diseases now alluded to, by a superficial examination of the pulse, an impression is generally received that there is a feeble state of the system, and hence, in place of a depletive or antiphlogistic mode of treatment, wine, bark, and stimulating remedies, have been employed. But you can be readily satisfied of the results of these two very opposite systems of treatment in some of those diseases, by observing the practice in the different hospitals of this city, where one set of patients, under the care of the surgeon, are bled profusely, and another set under another surgeon afflicted with similar ailments, get as much bark and wine as their stomachs can receive.

Though I have never found an incompressible state of the pulse, without venesection being an expedient measure, yet there are other sensations perceptible in the pulse which also indicate the propriety of blood-letting. A hard pulse,—a firm pulse,—a full pulse,—a wiry pulse,—an oppressed pulse, all, in their turn, either taken singly, or combined with other symptoms, more particularly local pain, hot skin, and white tongue, point out the propriety of employing venesection.

Natural Varieties of the Pulse.—No acquirement demands more attention and experience than such a knowledge of the pulse as to be able to distinguish its various peculiarities, both in health and disease. This knowledge entirely depends on the improvement of the sense of touch. Like that of sight and hearing, the sense of touch differs exceedingly in acuteness in different persons, but in all it is capable of improvement. You cannot expect at first to be able to distinguish these nicer shades of difference in pulses which are palpable to an experienced finger, any more than you could expect at once to perceive the slighter varieties in the shades of colour, so easily discernible by a skilful painter. All the senses require tuition. You ought to practise, and feel a number of different pulses, both of people in health, and of those afflicted with disease, one after another, and by first observing strong contrasts, you will ultimately become familiar with their lesser differences, all which essentially assist in pointing out particular states of the vascular system.

You will thus learn that there is a great variety in the pulse of different persons in health, in the number of beats at the different periods of life, and at different hours of the day, and that there is frequently a difference in the pulse of the arms of the same person, and, moreover, that the pulsations of the heart and arteries do not always correspond. The pulse, too, is usually found more frequent in women than in men, and in the morning is slower than in the latter part of the day, its quickness being increased by the various bodily and mental stimuli to which the person may have been exposed. To all these differences your attention ought to be directed as points of great practical utility, and some men of observation acquire more than others the tact of acutely discriminating these varieties in the pulse, and of perceiving its varied changes, whether arising from disease, or from accidental temporary causes.

Magendie has given a scale of the pulse, by which you will perceive that the difference in frequency between that of the infant and the aged, is more than double,—the quickness of the pulse gradually diminishing with our years.[*]

Changes in the Action of the Heart.—Besides the presence of fever, local pain, and the state of the pulse, the changes of the heart's action are an important indication in the use of bleeding, and one on which sufficient attention has not been generally bestowed.

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[*] *Scale of the Pulse.*

At birth............	130	to	140 in a Minute.
One year	120	—	130
Two years	102	—	110
Three years........	90	—	100
Seven years	85	—	90
Fourteen years	80	—	85
Adult age..........	75	—	80
First old age	65	—	75
Confirmed old age..	60	—	65

The pulsations of the arteries and those of the heart will be often found not to correspond. I do not mean as to the number of pulsations, but as to their strength and other qualities; and I may venture to assert, that generally in those cases where the pulse at the wrist is contracted and difficult to compress, the heart will be found to beat with an increased degree of vigour. Hence this vigorous action of the heart may be regarded as a useful guide in the employment of blood-letting, and when taken into account with the incompressible state of the pulse, will afford additional confidence to the surgeon in deciding on a deplesive system of treating the disease.

A knowledge of the heart's action can only be acquired, like that of the pulse, by an accurate examination of it in a number of individuals in health, as well as under the influence of disease ; and you ought to make yourselves as familiar with all the peculiar actions of the heart as with those of the pulse.

Case.—A young lady, who had all the symptoms of cerebral inflammation, for which leeches had been applied to the head, still complained of pain, with great depression, hot skin, and other symptoms of fever. Her pulse was small and incompressible though not frequent, and on examining the heart, to which I called the attention of the surgeon, he was surprised to find its action very tumultuous. Venesection was now employed, and whilst the blood flowed the pulse became more voluminous, and the heart's action was subdued. Syncope ensued after a few ounces of blood were taken, and the patient recovered without any farther depletion.

Case.—A lady, in a state of pregnancy, had been greatly debilitated, having vomited every kind of food and drink which she had taken for upwards of twenty days. I saw her at this period. She was emaciated and so feeble that her recovery was, by those around her, considered hopeless. She had a distinct tenderness in the epigastrium on pressure, and her pulse, which gave at first the impression of great languor, on more minute examination was very contracted, feeling like a thread, and incompressible, whilst the heart's action was vigorous.

This state of the vascular system gave me confidence that I should afford her relief by blood-letting, which was immediately resorted to, though with hesitation by the other medical attendants. No sooner had a few ounces of blood flowed from the vein than the pulse began to rise and acquire volume, and upwards of twenty ounces were abstracted before its vigour was subdued. The effect of this treatment was this,—that along with very small doses of the sulphate of magnesia, repeated at short intervals, the stomach no longer rejected food,—the alimentary canal was unloaded,—the patient's recovery was progressive and permanent, and she was delivered of a healthy child at the proper period.

The Local Pain.—In almost every case where venesection is necessary, there is present along with the changed action of the arterial system, local pain, more or less severe. The degree of pain, whatever organ the inflammation may affect, is no measure of the violence of the accompanying inflammation. On the contrary, persons often suffer severe agony when there is but slight inflammatory action ; whereas, when the inflammation has arrived at its acme, the local pain often becomes dull and obtuse, and diminishes in intensity.

Whilst it is always expedient to have recourse to blood-letting when there is a fixed and unceasing pain, increased by pressure, and accompanied by an alteration in the pulse and in the action of the heart, it is of great importance to be aware, that though the local pain is usually alleviated, as well as the action of the vascular system subdued, by venesection, yet general bleeding must not be continued, or repeated as long as the local pain is unabated. On the contrary, when all febrile excitement has been subdued by the bleeding, the remaining pain may be alleviated by opiates, either taken singly, or combined with calomel or antimony ; or local bleeding with leeches may be necessary ; or it may yield to the effect of a blister. Where local bleeding is employed, the degree of pain is the chief indication, both for adopting it, and for regulating its extent and repetition; and in inflammatory cases, accompanied with general febrile disturbance, the changes produced in the local pain are, along with those in the pulse, as has been already mentioned, an almost unerring guide for regulating the extent to which the bleeding ought to be carried.

Importance of the First Bleeding.—There is no maxim of the practical importance of which I am more fully convinced than that the loss of a certain quantity of blood at the first bleeding, is of greater utility in stopping the progress of disease, where general bleeding is required, than the loss even of a much larger quantity of blood by several successive bleedings.

I wish to be understood to say, that in place of taking a quantity of blood, say sixty ounces, at three successive bleedings of twenty ounces each, performed within thirty-six hours, an infinitely greater degree of relief will be derived from taking two-thirds of that quantity at one bleeding. Not only will the progress of the disease be thus more quickly and decidedly checked, but the patient will be saved the loss of twenty ounces of blood. This observation I have already made when speaking of the employment of venesection after operations where inflammation supervenes.

The good effect of abstracting so large a quantity of blood at the first bleeding might have been expected, without adopting any preconceived opinion or theory on the subject; for as we have been taught by experience, that the great benefit of abstracting blood is derived from the sudden change which such depletion produces on the action of the heart and arteries, it is evident that the change must be effected in a more decided manner by abstracting a quantity of blood suddenly, and at one bleeding, than by taking away an equal quantity slowly, and at more or less distant intervals.

In almost all cases where bleeding is employed, there is a disposition on the part both of the patient and the bystanders, and often too of the medical attendant, to be as sparing as possible in the evacuation of blood; whereas in the generality of cases an effort, I am convinced, should be made rather to take away as much as the patient can bear, and the surgeon should not desist until there be rational grounds to expect that a second bleeding will not be necessary.

A good general rule, in judging of the quantity of blood to be taken, will be found in the change produced in the action of the heart and arteries. The effect, however, of the abstraction of blood in relieving local pain, whilst the blood is flowing from a vein, is not to be entirely disregarded, though the only unerring criterion, as far as I have been ever able to discriminate, is that of the change produced in the *pulse*. That change in the pulse which marks the propriety of carrying bleeding no further, is the absence of the "incompressibility" which has been already mentioned. This state of the pulse, however, does not usually subside, until fainting or syncope supervene, in which case the pulse ought to be carefully watched after the fainting goes off, when it will be sometimes found that the sensation of incompressibility soon returns. If this takes place, more blood ought immediately to be drawn, and its abstraction persisted in, until the peculiar feeling of incompressibility is entirely subdued.

Case.—A young athletic officer complained of an intense pain in the head, accompanied with such depression that he could with difficulty move out of bed. His pulse was not much altered from the natural state, but there was a degree of incompressibility in it which pointed out the propriety of venesection. Upwards of forty ounces of blood were abstracted before syncope came on. I visited him two hours afterwards, when he had recovered from the state of fainting, and found a degree of incompressibility of the pulse still existing. I reapplied the bandage on the arm, and upwards of twenty ounces more blood were abstracted before the fainting state returned. These bleedings were followed by a complete relief of the pain in the head, and along with the free use of purgatives, calomel, and antimony, he permanently recovered.

When a large quantity of blood is not taken away at the first bleeding, or at a second quickly succeeding it, I have generally found that on all future occasions it is seldom practicable to abstract any considerable quantity, however much it may appear necessary; and thus it is, that when copious bleedings are not employed at the commencement of the treatment of inflammatory diseases, if the patient afterwards recover, it has generally been by resorting to a great number of small bleedings.

Case.—A young lady, at the commencement of an attack of peritonitis, had been three times bled in small quantities, and local as well as general bleedings were repeated whenever pain and febrile symptoms recurred; these were carried on each occasion as far as the pulse could bear, and always with relief. Yet she was bled, locally and generally, no less than seventeen times, before the progress of the disease was altogether arrested. I have long been of opinion, that it is only cases where bleeding has been too sparingly used at first wherein it is ever necessary to carry it to a great extent, and moreover it is only in such cases where you will see the pernicious effects of bleeding are exemplified.

It may also be mentioned that the decided and remarkable advantages to be obtained from the first bleeding, are strikingly illustrated by the practice of many intelligent veterinarians, and I have myself had frequent opportunities of observing the treatment of the inflammatory diseases of animals, whence I obtained, at an early period of life, grounds for much confidence in applying the same rules of practice in the treatment of the diseases of the human body.

Effect of Syncope.—You will find it laid down as a common rule in the treatment of many inflammatory diseases, that blood should be abstracted until syncope is produced; by which you would be led to suppose that the fainting was either a certain token of the quantity of blood that should be taken away, or that it was the act of syncope itself, and not the loss of the blood, which was to cure the disease.

Hence we often hear of persons being bled till they have fainted, as a proof of the activity of the practice which had been employed, without considering whether the fainting had been produced by excessive depletion, or from the particular position of the patient whilst the operation was performed. Suppose two individuals similarly affected, and in every respect in the same state, one of whom is bled in the erect posture until he faints, while the other faints from the loss of blood whilst he is recumbent. In the first patient the syncope will probably be produced by losing one-half of the quantity necessary to be lost before the second patient falls into a state of syncope.

In having recourse to venesection it is, therefore, important to consider whether the purpose of the operation be to abstract a certain quantity of blood from the system, or merely to produce syncope. When it is desirable to make a person faint with the loss of as little blood as possible, as, for instance, in a case where we wish to reduce a strangulated hernia, or a dislocated bone, then the venesection ought to be performed in the sitting posture. But for the treatment of diseases requiring depletion, or the abstraction of a certain quantity of the sanguineous fluid, fainting ought not to be considered as an index of the quantity of blood to be withdrawn, but the usual means should be taken to avert its occurrence, except when the patient is in a recumbent posture at the time the venesection is performed. Indeed you ought to be particularly cautioned against placing too much confidence when employing blood-letting for the cure of inflammatory diseases, in conceiving that if you have bled the patient *ad deliquium*, you have carried the bleeding to its full and necessary extent. On the contrary, when, in any case, syncope has followed the abstraction of an unusually small quantity of blood, while the patient was in a recumbent position, then you ought, in the space of one or two hours, again to examine the patient, when probably you will find that the action of the vascular system has renewed its vigour, and that the inflammatory symptoms continue, so that if blood be again allowed to flow from the vein, a very copious bleeding will sometimes be found requisite to reduce the pulse.

This "premature" state of syncope, as

it may be designated, not only arises from the patient's being bled in the erect posture, but is sometimes the effect of a moral influence, and, therefore, when, under such circumstances, the fainting state goes off, the inflammatory symptoms soon reappear.

Case.—A gentleman was seized with severe pains in the bowels, accompanied by a good deal of tenderness on slight pressure, along with some degree of febrile excitement. On opening a vein in the arm, only a few ounces of blood were removed, when the pulse sunk and he fainted. I visited him about two hours afterwards, when, having recovered from the state of fainting. and not having experienced any relief, I again applied the bandage on his arm. Blood flowed freely from the wounded vein, and he did not fall again into a state of syncope, until he had lost about thirty ounces of blood; and this, along with purgatives, was followed with permanent relief.

Quantity of Blood to be Abstracted.—It is very usual, particularly in this metropolis, for medical men to give *to others*, instructions to take a certain quantity of blood from a patient, with the same degree of confidence as they would prescribe a dose of some drug. Nothing can be more absurd in principle, and more injurious to the sick, than such a custom. The only indication to direct you in measuring the quantity of blood which ought to be abstracted in individual cases, is the change produced on the pulse, and in the local pain experienced during the operation. You ought never, therefore, to hazard any preconceived opinion of the quantity of blood which it may be necessary to remove, but always to watch the effects of the evacuation whilst it is proceeding.

It often happens, that a pulse in which little deviation from the natural state can be detected, and which, considered singly, would not particularly indicate the necessity of bleeding, begins to rise, and to acquire force after a certain quantity of blood has been lost, its force not being subdued until a large quantity, and a quantity much greater than could have possibly been anticipated as necessary, is removed. On the other hand, you will frequently meet with examples where the very reverse happens, and where a person, apparently of a full habit, with a strong elastic pulse, becomes quite depressed after losing but a very small quantity of blood. It is, indeed, with bleeding as with purging. Some persons never appear to be lowered even by the most active purge, whilst others are perfectly depressed, and the whole system is apparently deranged, by the operation of a brisk purgative.

If the observations which I have now made be correct, surely no one should pretend to predict or to specify the precise quantity of blood which any patient requires to lose. How little, therefore, must that practitioner consider the well-being of the sick, who, instead of performing the operation himself, ventures to prescribe the loss of any particular quantity of blood! Such conduct is highly derogatory to the character of the profession, and calls for the severest animadversion. At the same time, the practice is limited, I believe, to the metropolis. If it be true, as reported, that certain eminent practitioners have allowed their patients to remain several hours in a fit of apoplexy, or in a state of great suffering, rather than themselves perform the operation of venesection, it is only surprising that the legislature has not interfered, and indicted as criminals the culpable parties,—just as the law punishes those whose want of professsonal skill is the cause of injury to persons who are placed under their care.

In forming an opinion of the probable extent to which bleeding should be carried in different instances, you ought to be aware, that, in general, fat people can with impunity lose much less blood than lean persons, and large and robust individuals do not require the same extent of depletion in inflammatory diseases, as those who are thin and appear to be more delicate. So it is with respect to age, the young and plethoric often bearing much less bleeding than the old and thin.

To prevent, therefore, being guided by any preconceived notions on this point, I am always in the habit of letting the blood flow into a large basin, which permits also the most convenient mode of supporting the arm, and allowing no other circumstances to influence me in estimating the quantity to be removed, than the abatement of the local pain, and the changes in the action of the heart and pulse, to which I have already alluded. And with these, I may almost venture to say, *unerring* guides, and after many observations on numerous examples of apparently similar diseases, it is extraordinary to notice the difference in the quantity of blood which it is necessary to remove for the cure of the same disease in different cases.

There are still several important points connected with blood-letting, which have not yet been discussed, and which will afford ample materials for a future discourse.

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LECTURES ON SURGERY,

DELIVERED BY

MR. WARDROP.

OF THE SANGUINEOUS SYSTEM.

ABSTRACTION OF BLOOD.

Quantity of Blood to be abstracted; how estimated.—Syncope; — how beneficial.—Copious Hemorrhagies often not injurious.—Blood-letting, when to be repeated.—Differences in the Conditions of the Blood.

Quantity of Blood necessary to be abstracted.—In the last Lecture I endeavoured to impress on your minds more particularly three points: 1st. The peculiar incompressible state of the pulse which, in conjunction with other symptoms, indicates the propriety of general blood-letting; 2nd. The importance of the *first bleeding*, and the almost insuperable difficulties which are to be often overcome when this first depletion has been too sparing; and, lastly, I endeavoured to point out the propriety of abstracting blood until a fainting state or syncope supervened, in all cases wherein venesection is decidedly preferable to local bleeding.

You are now naturally led to inquire,—What is this quantity of blood which it is necessary to abstract at the first bleeding, in order to produce a state of fainting? Such, indeed, is the variety of the constitution of individuals,—such the difference in the severity of disease,—and such the difference of the period when called on to treat particular cases, that you will find, that whilst in some the pulse sinks after the removal of but a few ounces of blood, in others depletion must be carried to a great extent before syncope is produced.

When employing venesection, and observing the indications which have already been pointed out in order to regulate its extent, it will be generally found that the quantity of blood which you are able to remove before fainting comes on, is, in fact, never more than is requisite for the cure of the disease. Hence a person in health usually faints from the loss of a comparatively small quantity of blood, whilst the same individual, after suffering but a few hours from active inflammation, requires to lose an almost incredible quantity,—a quantity essential for the cure of the disease,—before he falls into a state of syncope. I have also observed, with regard to leeches, that the quantity of blood which flows from their bite, varies according to the degree of congestion in the vessels of the part to which they are applied, and, likewise, according to the necessity and propriety of removing such a quantity. Hence blood often flows for many hours after the first application of leeches, whilst an equal number applied at a subsequent period, and when the disease has been greatly subdued, yield comparatively a very small quantity of blood. This difference must no doubt depend on the different condition of the vessels at the different times the leeches are applied; and so it is with regard to venesection: a large quantity of blood may be taken away at the first bleeding before syncope is produced, whilst at every succeeding operation, fainting comes on from the loss of a smaller and still smaller quantity.

If you are to be guided in the employment of blood-letting by the principles which I have been endeavouring to inculcate, you will readily conceive the differences in the quantities of blood which must be abstracted in different examples even of the same disease; and whilst, in some instances, you will be disappointed, from the smallness of the quantity which flows from the vein before syncope supervenes, you will in others be surprised at the extent to which it may be carried, and with the happiest results. Hence the difficulty of attempting to give you anything like a precise idea of the quantity of blood which patients require to lose in the treatment of particular diseases. It would be no less absurd in me to attempt to specify the quantity of purgatives or diaphoretics necessary to complete the cure of a fever! The best general notions on this subject can only be attained by observing the quantity removed in a series of cases wherein blood-letting has been judiciously employed.

In the army and navy, where inflammatory disease often assumes a very severe type, surgeons are in the habit of abstracting thirty, forty, and sometimes fifty ounces of blood at the first bleeding, and even where the treatment is thus energetic at its commencement, from one to nearly two hundred ounces of blood have frequently been removed before the disease has been subdued; but amongst other classes of the community, where the physical frame is slender, a comparatively very small quantity is found sufficient to relieve and check inflammatory diseases. There is an observation which I would here venture to make as the result of my own experience, as well as from the many opportunities I have had of witnessing the practice of others, and that is, that of a number of persons bled for inflammatory diseases, those who have lost the largest quantities of blood, and have done so by the fewest operations, have made the most rapid recoveries; whilst those who had been more frequently bled, and had lost even a greater quantity of blood, but in small quantities, and at more distant intervals, have recovered much more slowly, and have had, more frequently, some permanent structural change of the affected organ.

Syncope; how beneficial.—The state of fainting which I have already endeavoured to point out as an unerring criterion for estimating the extent to which blood should be removed in those cases where general bleeding is most expedient, such as in inflammatory cases attended with febrile disturbance, and in dangerous congestions affecting the vital organs, syncope is, by most practitioners, taken as their guide; and though some have argued that a state of syncope thus brought on may be pernicious and even dangerous, I have never either met with, or heard others describe, a case where general bleeding judiciously resorted to caused any serious mischief from carrying it so far as to produce syncope. You ought in considering this point to discriminate between those cases where the bleeding has been employed as a curative means, and those wherein a profuse hemorrhage has taken place from wounded vessels, as from accidents, or from a partial separation of the placenta. In these the bleeding may not only produce syncope, but such may be the size of the vessels, that the blood continues to flow until life is nearly or even completely extinguished. But in the operation of taking blood from a vein, its flow can and ought to be arrested whenever syncope takes place; and surely no surgeon ever attempted to persevere in the continuance of the abstraction of blood from a person in this state. On the other hand, the state of fainting is to be considered as an index of the quantity of blood necessary to be removed for relief from the disease; and, as I have already said, you will always find that quantity to be in the ratio of the propriety and necessity of procuring it.

Though it has been stated that in no case of syncope produced by venesection, have I ever known any subsequent pernicious effects, yet you ought to be warned, that in some cases it has been carried to the very last extremity, and the consecutive symptoms have caused great alarm to the bystanders as well as to the operator. Such cases, however, must be truly rare, for accustomed as we are to hear daily of persons being bled to a great extent, yet such alarming effects are seldom heard of; and recollect also how many hundreds or even thousands of persons in this community are bled every day, and how few accidents of any description ever happen.

Case.—The most alarming effect of syncope from venesection I ever witnessed, took place in the person of a surgeon, who had an attack of inflammation of the brain, and for which he had been repeatedly bled, both by venesection and leeches, but in small quantities, without relief. His state was characterized by a dull unceasing pain in the head, which did not influence the intellectual functions, but was attended with great intolerance of light, sound, and motion. The pain becoming more intense, though his pulse was so natural in frequency and apparently so feeble as to discourage his attendant from repeating the bleeding, yet he could himself detect an incompressible feeling in it, which peculiar feeling he knew to be an unerring index of the propriety of venesection. His attendant, contrary to his own opinion, however, opened a vein, and after a very few ounces of blood were abstracted, the patient became faint, which caused the removal of the bandage. When he recovered from this state, and was able to apply his own finger to the pulse, he could still distinguish its incompressible character, and experiencing likewise the fixed pain in the head, he entreated his friend to replace the bandage. This done, a very large quantity of blood was removed before he again fainted, and the state of syncope was so complete that he remained insensible upwards of five hours, during which period those around were in the greatest apprehension, the powers of life being so exhausted, that during that long interval the pulse could not be distinguished at the wrist, and the respiration could hardly be recognised. Such however was the effect of this protracted state of syncope on the disease in the head, that when the patient awoke, as it were into life, and was able to articulate, his first expression was, that the pain in his head had vanished, and that his pulse was completely subdued. This patient's recovery was speedy and complete, requiring no further remedial means,—and in about six weeks his health and strength were perfectly restored.

This interesting and instructive case demonstrates to you in the most striking manner how completely inflammatory disease can be arrested and subdued by producing a diminution of the heart's action; and also how, in the treatment of diseases, though a very moderate venesection may diminish the unnatural action of the vascular system, when the depletion is pursued to the extent of producing syncope, the longer the duration of that syncope is, so much the more completely will the inflammatory action be subdued. The state of collapse, as it is called, which antimonial preparations produce by their influence in diminishing the action of the heart and arteries, subdues inflammatory disease on the same principle as the abstraction of blood.

I have also, in a few instances, observed persons recover from inflammatory affections, whose vital powers appeared so reduced as to render their condition apparently hopeless, but which low condition seemed to be the very means of arresting the diseased action.

Case.—A girl, about ten years of age, had suffered severely from hooping-cough and congestion in the brain, for which the depletive system had been adopted; but such was ultimately the state of debility to which she was reduced, that I found her apparently lifeless, and surrounded by her parents, bewailing her approaching dissolution! Without a shadow of hope I poured a spoonful of wine into her mouth, and instructed her attendants to give beef-tea and wine alternately, and at short intervals. Considering any further professional attendance unnecessary, and calling the following day on the other surgeon who had visited the patient, requesting him to get permission to examine the body, think of my surprise, when with a smile he informed me that the patient was doing well, having recovered every hour after the exhibition of the cordials!

Cases of this description ought to teach us the propriety of never ceasing to give assistance, however slender it may appear, for the purpose of prolonging life, and I am confident it not unfrequently happens that the state of great debility or collapse in which you may occasionally observe those who have severely suffered from febrile diseases and large depletions, becomes the very means of arresting disease. Such an effect is most to be anticipated, even when life has been apparently nearly extinguished. In the diseases of children, more particularly when the vital powers have been greatly exhausted, and when the child refuses his food, I have frequently known instances where the infant was in this state, and its life was despaired of, and when no endeavours were made by the parents to prolong its existence—that the vital powers were resuscitated by forcibly separating the teeth, and forcing cordials into the mouth, always taking care in such cases that the fluid is conveyed by the spoon to the root of the tongue. The truth of the common maxim, that "whilst there is life there is hope," is here strikingly exemplified.

Copious Hemorrhagy often not Injurious.

From a general impression that blood-letting ought not to be employed but in diseases of a serious character, and that it is a remedy from which much mischief may ensue, if carried to too great an extent, or employed in improper cases, it is, no doubt, on many occasions, too tardily resorted to, and too sparingly used, whilst we every day see medicines, the effects of which may be highly injurious to the constitution, fearlessly and carelessly exhibited. That this dread of blood-letting is not founded on sound observation, is demonstrated by noticing the effects of spontaneous hemorrhagies—of profuse bleedings, so often the consequence of injuries, and also in diseases where they have accidentally taken place.

Alarming hemorrhagies sometimes ensue during, or after, operations; and I have already remarked, that those patients recover much the soonest, in whom such a large quantity of blood has been lost.

In the spontaneous hemorrhagies from mucous membranes, as from those of the nose and rectum, it is extraordinary what large quantities of blood persons lose with no other sensible effect, when they have no organic disease, than the production of more or less debility.

Case.—A man was admitted into the Hospital of Surgery with dropsy, which he expected would be relieved by tapping. A few hours after his admission, he was seized with bleeding from the nose, and although his pulse was feeble and his skin cold, having lost not less than two quarts of blood, I bled him at the arm; the bleeding from the nose then ceased. But the particular circumstance in this case was, that notwithstanding the great loss of blood, his pulse on the following day became firm and wiry, and was accompanied by pain in the abdomen; he was therefore again bled at the arm. On the second day the pulse rose, and he was bled a third time, after which he was tapped, and got a large dose of calomel and opium. This treatment had the effect of completely mitigating his sufferings. Calomel and squills were then given, until his gums became tender. He left the hospital fourteen days after his admission completely relieved, and a few weeks afterwards I saw him in perfect health.

The quantity of blood which some persons lose from Hemorrhoids, is also extraordinary. I have known instances of delicate females losing daily, on an average, from half a pint to a pint of blood for many months, and even years,—a quantity which, when compared with the largest quantities of blood ever removed by artificial means, appears astonisbing; and the slight disturbance of the system, which such profuse hemorrhage occasions, seems indeed unaccountable.

Similar effects of the loss of large quantities of blood are exemplified in cases of varicose veins accidentally ruptured, and from which immense quantities of blood have escaped, without any perceptible injurious consequences. PETIT particularly mentions such cases.

Hemorrhage to an enormous extent sometimes happens on the field of battle, wounded soldiers having been often left apparently lifeless, and, as has been already observed, such wounded men recover with unusual rapidity, from the complete check which is thus given to consecutive inflammation.

Very extraordinary, also, is the quantity of blood that females sometimes lose from the partial separation of the placenta, and without any other bad effect than temporary debility. Women under such circumstances have been known to lose several quarts of blood in a few hours!

These facts, taken collectively, prove to what an extent blood may be lost, without being followed by serious consequences. And the practical conclusion to be deduced from them is, that blood-letting may be extensively employed, when duly managed, for the cure of disease.

Blood-letting, when to be repeated.

Though, in the generality of cases, much depends on the full quantity of blood being taken at the first bleeding, as well as having recourse to blood-letting in the early stages of disease, still there are others wherein the complaint can only be cured by the frequent repetition of venesection.

The frequent repetition of blood-letting is rendered necessary from different causes. It becomes requisite in some instances, in consequence of a fainting state coming on after only a small quantity of blood has been abstracted, and, in other cases, when the pulse sinks after a very moderate quantity has been removed.

But when, from whatever cause, the quantity of blood is small, it ought to lead to the more close watching of any return of the symptoms, and prepare you to repeat the bleeding.

Now it frequently happens, that on the repetition of the venesection, the cause which prevented the first depletion being sufficiently copious, no longer exists, so that at a future bleeding any quantity of blood which may be deemed necessary, can be readily abstracted.

But the most frequent cause for repeating venesection is, that to whatever extent the first bleeding may have been carried, it is seldom that one depletion is sufficient to check the progress of a severe attack of inflammation, particularly in an important and vital organ.

Always bear in mind, that the more complete the syncope has been from the bleeding, and the sooner the second bleeding is performed after the pulse has begun to rise, the less will be the quantity of blood necessary to be taken away at the second bleeding, as well as the aggregate quantity for the complete cure of the disease. After the first bleeding, therefore, the pulse ought to be closely watched, due attention being also paid to the other symptoms; and whenever the vascular system has begun to recover its vigour, which may take place in three, six, or twelve hours, then replace the bandage on the arm, wipe away the coagulum in the wound of the vein, and allow the blood to flow, until the strength of the heart and arteries is again subdued.

Different Conditions of the Blood.—There are appearances which blood presents, both whilst it flows from the vein, and after it has been kept some time and allowed to coagulate, which have been considered as affording criteria for regulating the quantity of blood to be withdrawn, and also for the repetition of venesection.

In violent inflammations, the blood usually flows from the wound in the vein with great force; whereas in other diseases the stream is comparatively slow. In the first case the bleeding ought to be as profuse, as in the latter it should be limited.

The colour of the blood as it flows from the vein, also varies in different examples of disease, being in some very florid, or of a scarlet red, and in others of a crimson red or deep purple colour. The first state of the blood indicates the propriety of bleeding, whilst the latter points out a state of the system where but a very moderate depletion is admissible.

The appearances which blood assumes after it has been allowed to stagnate, are also supposed to afford criteria for the repetition of venesection. The appearance of a buffy coat, and the comparative quantities of crassamentum and serum have especially been considered as an index of the existence of inflammation, and of the propriety of blood-letting.

Whilst all these circumstances are mentioned, I must at the same time repeat what was stated in a former lecture, when explaining the different changes of the blood, that these can never be a criterion for estimating the quantity proper to remove, whilst the blood is flowing from the vein, neither can any appearance of the blood after its coagulation guide you in repeating the venesection. The appearance of the buffy coat has been chiefly dwelt on as an important character of the inflammatory diathesis; but as I have also observed, the buffy coat is not to be a considered either as a certain test of inflammation, or a safe index of the propriety of bleeding. There is usually no appearance of the buffy coat in blood removed from persons affected with viorent inflammations until the latter stage of the disease, and at the very time when the further abstraction of blood would he pernicious; and, on the other hand, in many diseases where blood-letting is unnecessary or even hurtful, the buffy coat may be occasionally observed.

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OF THE SANGUINEOUS SYSTEM.

ABSTRACTION OF BLOOD.

Causes of Failure in Venesection,—how to be remedied.—Operation of Venesection.—Injurious Effects of Blood-letting,—immediately after Injuries,—during a fit of Apoplexy,—in particular Cases of Inflammation,—in irregular Distributions of Blood—in Specific Diseases.—Different Methods of Abstracting Blood;—When to be employed,—by Venesection,—by Cupping,—by Leeches,—by Scarifications.

Causes of Failure in Venesection,—how to be Remedied.

In endeavouring to point out the indications by which the quantity of blood should be regulated when blood-letting is had recourse to in the treatment of diseases, it has been taken for granted that the surgeon has it always in his power to abstract whatever quantity he may deem necessary. This, however, is not always the case, or at least the requisite quantity of blood is not always obtained without some difficulty, and nothing is more common than to hear of patients suffering from the want of losing a sufficient quantity of blood, affirming that it was impossible to bleed them to the desired extent.

I have always considered it a dangerous maxim to admit the possibility of such an occurrence; and have ever contended that any quantity of blood deemed necessary can by some means or other be taken from every patient. Should the veins in the arm be inadequate for this purpose, then may the jugular veins, or the veins of the wrist or the feet, be opened, or, in cases of danger, when no time ought to be lost, why should not an arterial trunk be opened? The most severe operations are daily resorted to to save life, and surely a fellow-creature should not be allowed to die for want of the loss of a quantity of blood! In the *Transactions of the Med. and Chir. Society*, there is a case narrated wherein the necessary quantity of blood could not be obtained from the veins of the arm, and where the bold and decided practice of opening the radial artery was successfully adopted.

I recollect only one instance where I could not obtain by venesection the desirable quantity of blood, the patient becoming so extremely cold that scarcely any blood would flow from the wound, and this had happened to her on several former occasions.

It ought also to be remembered that when neither venesection nor arteriotomy can be performed, a large quantity of blood may be abstracted by leeches or cupping. The French are in the habit of applying at one time from fifty to a hundred leeches in cases where we would employ venesection.

The Operation of Venesection.—It will here be proper to allude to some circumstances which, from a want of due care in performing the operation of venesection, are frequently the cause of failure in procuring the requisite quantity of blood.

The operation of blood-letting seldom has that degree of attention paid to all its details which it so well merits, and although every one considers himself perfectly capable of performing so simple an operation, still it cannot be denied that it is often executed by one surgeon much better than by another, and is, indeed, seldom perfectly well performed. The incision in the vein is either too small or unnecessarily large — the bandage too tight or too loose, or some circumstance essential to the success of the operation, however trifling it may appear, is not duly attended to. The assertion of the late Benjamin Bell, in his valuable system of surgery, does not go too far when he affirms, that, "Whilst I have frequently seen every other operation in surgery well performed, I have seldom seen blood-letting, with the lancet, correctly done."

I would strongly recommend to you the study of his writings on this subject, and to take care, when performing the operation, that you attend strictly to every step,—that you select the largest and most superficial vein in either arm,—that the bandage is applied neither so loose as not sufficiently to compress the veins, nor so tight as to diminish the flow of blood through the arteries,—and also that the inferior edge of the bandage be close to that part of the vein where the wound is to be made,—that the lancet be perfectly sharp, and the wound in the vein sufficiently but not too large,—that the patient be placed in an easy and recumbent posture, having the arm placed upon a common hand-basin, one edge of which will support the arm, and the other the fore-arm, and thus prevent the patient being fatigued, and also the orifices in the skin and vein will always be made to correspond.

All these circumstances demand attention in performing the common operation of phlebotomy; and as so much depends,—even the life of a patient,—on the prompt and successful manner in which it is executed, you cannot bestow on it too much consideration.

Injurious Effects of Bleeding.

Hitherto those classes of diseases only have been pointed out wherein bleeding may be employed as the chief curative means; but there is another class of cases wherein this energetic remedy ought to be used with much caution.

Immediately after an Injury.—There is a class of cases in which blood-letting is often employed very unnecessarily, and often, too, perniciously. I allude to the common practice of bleeding persons immediately after an accident, or during an apoplectic or convulsive fit. In many accidents, more particularly where the head suffers, the first effects of the injury are a diminution or collapse of the vital powers; and if, under such circumstances, blood-letting be had recourse to, a still further diminution of the vital powers is produced. It is not until the powers of life have revived, or that a reaction has taken place, that you should, after severe injuries, employ blood-letting, and even then it ought to be had recourse to with great circumspection.

Case.—The servant of a medical society getting a fall at the time of one of the meetings, and whilst still in a state of insensibility, was bled. It was at least fifteen months after that bleeding before she recovered her strength, although it was very moderate in quantity. Indeed, I suspect that many patients have suffered, after accidents, from a too early use of the lancet.

During an Apoplectic Fit.—In cases of apoplexy, I believe that blood-letting has frequently been carried to a very unwarrantable, and even fatal extent.

In proportion to the violence of an apoplectic shock, so are the powers of life diminished; and hence, if the quantity of blood abstracted be regulated by the severity of the symptoms, in like proportion will it be hurtful by still farther diminishing the vital powers. When a person is in a state of insensibility from an apoplectic fit, those around are too apt to urge the necessity of bleeding, conceiving that the loss of blood will cure the disease in the head, of which the fit is merely an effect or symptom.

Case.—A surgeon was sent for to see a patient, who had fallen down suddenly in an apoplectic fit; he immediately opened a vein, and after abstracting only a few ounces of blood, the pulse sank. When he visited this patient, several hours afterwards, he found the powers of life so feeble that he ordered him cordials, by which the action of the heart and arteries began to revive. Soon after this, however, another surgeon was called in, and he repeated the venesection, after which the patient sank rapidly, and in a few hours expired.

There are cases of plethora or congestion in the brain, producing a sudden loss of the intellectual powers and convulsions, in which too much blood can scarcely be removed to save life; but in such cases the pulse is strong, usually acquiring vigour whilst the blood is flowing from the vein.

Case.—A general officer, of a full plethoric habit, and who had suffered occasionally from gout, had, in consequence of a slight pain in the great-toe, taken a brisk purgative, and whilst walking on the following day, which happened to be unusually cold, he felt a chill, suddenly became giddy, and fell down in the street, senseless and motionless. I found him in this state, but his pulse, though strong, was little changed. I immediately opened a vein in the arm, and the blood flowed freely through a large orifice; at first the pulse gradually acquired strength, and increased in frequency, but was not subdued until upwards of forty ounces of blood were abstracted, when he immediately became sensible to things around him. In this state he was removed to his own house, and in a very few hours the vigour of the heart and arteries revived, accompanied by uneasy feelings in the head, when about the same quantity of blood was taken away as on the former occasion. These depletions, along with a continuance of an antiphlogistic regimen, were the means of producing permanent relief.

In cases where there are organic changes in the brain's structure, and when the sudden apoplectic attack is caused by some vessel of the diseased part giving way and pouring out blood, blood-letting is of no avail, and when had recourse to when the pulse is feeble, and the vital powers already are much diminished, it never fails to hasten the patient's death: therefore in such cases blood-letting ought to be resorted to with great caution.

Case.—A lady considerably advanced in life was found during the night lying on the floor,—her servant, who was in an adjoining apartment, having been awoke by the noise of her mistress falling out of bed. She was perfectly insensible, and the pulse so languid, that the surgeon who was sent for ventured to take only a few ounces of blood by cupping; her pulse never revived, and in four hours she expired. It was found that her death was occasioned by an effusion of blood into the ventricles, the heart and aorta being also diseased.

It is in cases of this description that blood-letting, even to a small extent, must, by diminishing the powers of life, prove injurious, and, if carried further, inevitably hasten dissolution.

In particular Inflammatory Cases.—There are also individuals in whom the loss even of a very small quantity of blood produces great exhaustion and depression, and where it is impossible to carry depletion to the ordinary extent, even when they are labouring under inflammatory diseases. But you cannot possibly be aware of such constitutional peculiarities, unless by previous observation on the patient.

Case.—A lady about the middle period of life, who had suffered much from bad health, was suddenly attacked by all the usual symptoms of peritoneal inflammation. I found her in great agony, with a fixed pain in the abdomen, great tenderness to the touch, a very rapid pulse, and other symptoms of fever. Having taken repeated doses of opium without relief, I opened a vein in the arm, and before five ounces of blood were abstracted, the pulse sunk and she fainted. When I visited her two hours afterwards, she had recovered from the state of syncope, and her pulse was revived, but very rapid and easily compressed. The local pain not having abated, the bandage was replaced on the arm, and scarcely had a couple of ounces come away when the pulse sank, and she again became faint. The pain in the abdomen not being relieved, after having recovered from the state of syncope produced by the second bleeding, I gave her a grain of opium with five of calomel every few hours, by which means the pain and other symptoms were rapidly subdued.

Another nice point to determine in the employment of blood-letting, occurs in those cases of inflammation where the powers of life are already so much exhausted from the duration of the disease, that though there may be a probability of the inflammation being subdued by bleeding, yet the exhaustion produced by any further depletion may of itself destroy life. Under such circumstances, therefore, in place of blood-letting, recourse should be had to those other means which art possesses to control the action of the heart and arteries. I allude to the use of large and frequent doses of the tartrate of antimony, to mercury combined with opiates, and to colchicum.

It often happens, that in cases where bleeding has been employed, the local pains accompanying the disease do not subside, and symptoms continue, or succeed, just as severe as those which preceded the venesection.

In such cases it is also a nice point to determine how far bleeding is to be carried;

and some men of experience and accurate observation are very acute in perceiving those symptoms which can be relieved by blood-letting, and those which can be removed by blisters, anodynes, mercury and opium, colchicum, and such-like remedies.

In Irregular Distributions of Blood.—Bleeding will also be found more or less injurious when had recourse to in cases where there is merely an irregular distribution of the blood, or where there is an undue quantity in a particular part, without any increase in the quantity of the whole mass. Such cases are quite different in their pathological characters, both from those of congestion and of inflammation, and these three different conditions of an organ ought to be accurately distinguished.

In *congestion*, the quantity of the sanguineous fluid is increased, or the vessels are in a state of plethora. In an *inflamed part*, a change of structure is going on, so that if you compare an organ in a state of congestion with one which is inflamed, and macerate each in water, the blood of the first is washed away, leaving the natural structure unchanged; whilst in the inflamed organ, besides an increased quantity of blood, a change has been going on in the structure of the organ, more particularly an effusion of a sero-albuminous or puriform fluid, into the cellular membrane. Where there is an *irregular distribution of the blood*, and an undue quantity sent to a particular part, there is a corresponding diminution of the blood in some other parts, and it is in such cases where the abstraction of blood is always useless and sometimes injurious.

We have examples of these irregular distributions of blood in affections of the head and chest. Persons suffering from bilious and aguish headachs, as they are usually called, frequently have a flushed countenance, and an increased action of some of the branches of the external carotid artery; but they are not accompanied by any of those changes in the pulse which indicate the use of blood-letting, and are marked by symptoms showing a diminution of blood in some other parts of the body, and more particularly in the limbs, by a painful sense of coldness in the feet.

Persons who have often had bilious headachs, accompanied with a flushed face, and for which bleeding has been ineffectually tried, may, however, also have feelings of uneasiness in the head of a different character, and of that description wherein bleeding is highly beneficial. I have known several serious practical errors committed from the surgeon not being aware of this circumstance, and treating a headach from congestion of blood like an ordinary sympathetic headach. And patients themselves, subject to headachs from derangement in their digestive organs, are apt to attribute every uneasiness in the head which they may at any time experience, to the same cause.

Case.—The late Dr. Baillie frequently suffered from headachs connected with chylopoietic derangement; and on several occasions they were so severe, that he had been induced to try the effect of cupping, from which, however, he did not experience the smallest benefit. Perceiving one day some spectra or images floating before his eyes, accompanied by uneasy feelings in the head, he asked my opinion; and considering that these symptoms were of a plethoric character, and indicated congestion within the head, I recommended the abstraction of some blood. To this he at first objected, from the inutility of former bleedings; but on representing to him the difference in the character of the present symptoms, leeches were applied behind the ear, which gave such relief as to induce him to repeat their application on the following day, by which treatment the spectra disappeared, and he was perfectly relieved from all uneasy feelings in the head.

Case.—A gentleman, who had often suffered from what he called "blind headachs" during forty years of his life, consulted the surgeon who lived in his vicinity, relative to some feelings in the head. Considering these symptoms to be unconnected with the "blind headachs," he advised him to be bled at the arm, which advice, however, was not followed. He now consulted a physician, who recommended to him the use of the sulphate of iron; and another physician, whom he afterwards consulted, recommended tonics, wine, and a generous diet. Having pursued this plan, and while he was on a visit to London some weeks afterwards, I was hastily sent for to see him, when I found that one side had become paralytic, with every symptom of congestion in the brain, and for the treatment of which he required repeated blood-letting.[*]

In Specific Diseases.—In diseases usually called specific, such as syphilis, cancer, scrofula, gout, and rheumatism, blood-letting is often injurious, though it is sometimes useful when employed within certain limits.

Whatever organ is affected with acute rheumatism, there are always accompanying symptoms of an inflammatory type. Yet it is well established, that persons suffering from this disease cannot bear copious bleedings, and its too frequent repetition has certainly, in many instances, laid the foundation of chronic affections, more particularly of hypertrophy, or thickening of the muscular structure of the heart.

The same observation applies to persons affected with gouty inflammation in any organ. You will find that, in some cases, a certain extent of depletion will mitigate the inflammatory symptoms attending gout, but if the depletion be carried beyond a certain extent, it no longer alleviates the pain; the whole system seems to suffer, and the local disease is apt, as in rheumatism, to assume a chronic and unyielding form.

With regard to blood-letting in specific diseases generally, I may here observe that there is often not only the specific inflammation to contend with, but there is also more or less common or idiopathic inflammation accompanying the specific disease, and it is this idiopathic inflammation which ought to be treated by blood-letting, the bleeding having no influence in subduing the specific disease. It is not uncommon to observe a specific inflammation, once excited, thus cause an accompanying idiopathic inflammation.

In syphilis, for example, besides the primary ulcer, a great degree of inflammation of the adjacent parts sometimes supervenes, which inflammation is relieved by bleeding, and would be aggravated by the use of mercury. After this idiopathic inflammation is removed, then you can proceed to the cure of the specific disease by mercury. So it is in cancerous affections; the tension and swelling accompanying a scirrhous tumour can often be relieved by general and local blood-lettings. In proof of such bleedings being proper under certain circumstances, may be noticed the spontaneous hemorrhages to which such diseased parts are subject, and the effects of blood-letting in relieving certain states of plethora and congestion of the adjacent viscera.

The same remarks apply to the treatment of Gout. When gout affects any part of the body, it is often accompanied by an inflammatory swelling and pyrexia, which are relieved by bleeding, but the bleeding has no influence on the specific affection, and hence the usual practice in gout, of first subduing any severe local inflammation and pyrexia by depletion, and then and not till then, administering the specific remedies for the cure of gout.

The extent to which blood-letting, whether general or local, is to be carried in different specific diseases, and the particular circumstances which render these necessary, will be pointed out when that class of diseases comes under particular consideration.

Different Operations for abstracting Blood; when to be employed.

Before directing your attention to the comparative effects and the comparative advantages of abstracting blood by each of the several different operations of venesection, arteriotomy, cupping, leeches, and scarifications, it is of importance to keep in mind those states of the vascular system which require the use of this remedy.

I have already mentioned that whenever local inflammation exists so severe as to excite fever, venesection is then decidedly preferable to any other mode of abstracting blood. I have also endeavoured to point out what appeared to me to be the disadvantages of arteriotomy, and the few cases and particular circumstances to which that mode of depletion is applicable.

By Cupping.—In all cases of local inflammation where the general system is not disturbed, leeches are preferable to venesection; whilst the operation of cupping holds as it were a middle place, being applicable in cases where there are no febrile symptoms, and where leeches might be employed, as in local inflammations and congestions, and also in cases where the action of the vascular system is increased. In all inflammations and congestions about the head, cupping on the back of the neck and between the shoulders is a most useful mode of abstracting blood, and this operation is also particularly applicable for the removal of blood from the parietes of the chest and abdomen in diseases of the different viscera. Its use, however, is only admissible when it can be employed without exciting pain, and irritating the diseased organ. In such cases I have often seen cupping do mischief. For the same reasons cupping inflamed joints, or parts accompanied by external tenderness, is often injurious, so that in such cases leeches are decidedly preferable. Cupping is also preferable in those cases where the application of leeches is followed by severe erysipelas of the skin. The very circumstance of the cupping-glasses irritating the tender parts, and drawing blood from the surrounding parts to the place where they are applied, renders it an eligible mode of abstracting blood in cases of congestion, more particularly of the brain, the glasses being, in such cases, applied to the nape of the neck—whilst cupping is the least preferable mode of abstracting blood when the application of the glasses excites pain, and the influx of blood to the diseased part is increased. Although, therefore, the operation of cupping may be, under many circumstances, a useful and even most preferable mode of abstracting blood, yet it cannot be denied that there are no cases where cupping can be useful in which all the essential benefits of abstracting blood by that operation might not be obtained either by venesection, or by leeches, or by a combination of both of those methods. I have often remarked, that in this metropolis, where there are so many dexterous performers of this operation, persons, more particularly those subject to plethora in the head, are apt to indulge in a luxurious system of living, the injurious effects of which they can at all times have readily removed by cupping.

By Leeches.—Whilst there are diseases which can only be properly treated by venesection, there is also another description of cases, wherein the application of leeches is proper after general bleeding or cupping.

Leeches are by far the most eligible mode of local blood-letting in the generality of cases, not only because they procure the necessary quantity of blood from the parts where the application of the cupping-glasses would cause great pain and irritation, but also because, from the great dexterity required to perform the operation of cupping, it is seldom well done, and cannot be commanded in situations and at times when leeches can easily be procured.

Leeches are in a more especial manner preferable in all cases of local injury, before the accession of fever. When a part is bruised, the whole frame receives a shock in proportion to the severity of the accident, and no sooner does the system recover, and reaction take place, than the bruised part becomes more or less tense and painful, which symptoms indicate the commencement of inflammation. If in this condition a sufficient number of leeches be applied to the parts, the inflammation will be immediately subdued, and if they be again and again applied, without delay, and in numbers proportionable to the severity of the symptoms whenever there is any return of pain and swelling, you can thus completely check and subdue every inflammatory symptom, and avert all the evils of the accident.

Case.—A gentleman fell from his horse, and severely bruised the elbow-joint and surrounding soft parts. Leeches were employed immediately after he recovered from the shock occasioned by the injury, which, along with fomentations and poultices, afforded great relief; but whenever the bleeding ceased, pain and a feeling of tension returned. More leeches were then applied, and so on, one or two dozen being repeated whenever the bleeding from the former wounds ceased and the pain returned, so that in four days one hundred and eighteen leeches were applied. The effect of this practice was, that in a week this patient had completely regained the use of his arm, and, except the debility, from which he recovered in a few weeks, no bad effects ensued. In this manner, and on this principle, have I, by the repeated application of leeches, kept up a constant oozing of blood from injured parts, until every inflammatory symptom has been completely checked and subdued.

When this system of treatment is not employed early,—almost immediately after the effects of the shock have passed away, and time is given to the inflammatory symptoms and a febrile disturbance of the system to supervene, then the treatment must commence with general bleeding, conducted on the principles which I have already endeavoured to establish.

If, besides a bruise, the soft parts are wounded, the subsequent hemorrhage often goes far in checking the approach of inflammation; and hence, when wounds have bled freely, and when they have not been irritated by dressings and bandages, it is seldom that any inflammatory symptoms ensue, nor does any local or general bleeding become necessary. When speaking of the advantages of bleeding during operations, I also endeavoured very fully to explain the importance of such hemorrhage in checking inflammation in wounds.

When leeches cannot be procured, the requisite quantity of blood may be obtained by opening with a lancet one or more of the veins contiguous to the injured parts; and this mode of blood-letting is particularly applicable in injuries of the extremities, where there are so many accessible and sufficiently large veins. The advantages of applying leeches, which have been enumerated, are also to be derived from this method, in all local affections where the parts from which the blood is to be withdrawn are tender to the touch, and where any other mode of local blood-letting is inadmissible.

In the application of leeches, it is important to be aware that the bleeding from their wounds is never in the ratio of the number applied; and you will often be surprised to find three or four leeches bleed as much on one occasion, as at least double the number on another. Usually, when a large number is applied, the blood flows most freely from a limited number of wounds, which continue to bleed long after the bites of the others have ceased. This probably depends on the principal vessels supplying the part on which the leeches are applied being wounded, and those wounds which happen to be made nearest the heart bleeding more than those in the more remote branches. The bleeding too from leeches varies much in quantity, not only according to the state of the circulating system generally, but also according to the degree of inflammation or congestion in the part where they are applied; and very remarkable is the difference in the bleeding from the same number of leeches on the same part at different times, the quantity diminishing as the fulness of the vessels is diminished. This fact coincides with the observations I made on the quantity of blood necessary to produce syncope in inflammatory diseases, which I remarked was always in proportion to the quantity necessary for removing the disease.

Case.—I was consulted by a surgeon on the case of an old lady who had all the symptoms of hypertrophy of the heart, the impulse of which organ had become extremely vigorous, with excessive embarrassment in breathing. In place of venesection, I recommended the application of four leeches on the region of the heart. The leech-bites continued to bleed freely during fifteen hours, subduing both the unnatural vigour of the pulse and the action of the heart. Two days afterwards the same number of leeches were again applied, and, to the astonishment both of the patient and her other medical attendant, but a very small quantity of blood came away.

Leeches, too, bleed very differently at different seasons and in different states of the atmosphere, over which we have no control. It is also of importance to keep in mind, when comparing the effects of cupping and leeches, that advantages are derived from the long-continued fomentation of the affected parts to which the leeches have been applied, as also to the soothing influence of a poultice, which ought always to be used after the fomentations.

One disadvantage of the use of leeches is the difficulty of always regulating the extent of the bleeding, but I have already observed, that the discharge from their bites usually depends on the degree of congestion of the vessels of the part to which they are applied, and that they seldom bleed more than is requisite. When it becomes from any cause desirable to put a stop to tho bleeding, this can in most cases be readily effected by simply exposing the surface of the part to the external air, and allowing the blood in the orifices to coagulate. The usual practice of applying compresses and bandages, and heaping them on in proportion to the activity of the bleeding, tends to promote instead of checking the flow of blood, as shall be more particularly explained when treating of wounded blood-vessels.

Case.—I was sent for early one morning to visit a lady who had violently sprained her wrist on the preceding day, and for which she had applied leeches. They had bled freely all the evening, and so profusely during the night, that a variety of styptics, compresses, and bandages, were used, but without arresting the hemorrhage. The injury having been severe, and the pulse not being altogether subdued, I told her that she had not lost too much blood, and that the constant oozing from the leech-bites had been the means of preventing the accession of inflammation. The patient being alarmed, however, I thought it expedient to arrest the bleeding, and scarcely had the bandages and thick compresses been removed, all of which were soaked in blood, and the hand and arm exposed to the cool air, than the flow of blood began to diminish, and in a few minutes was completely stopped.

When this simple means is not sufficient, you will seldom fail to stop the bleeding from a leech-bite, by applying a small compress not larger than a finger-nail, and consisting of several folds of lint, directly upon the bleeding orifice, on which such a degree of pressure is to be made with the point of only one finger as shall be found sufficient to stop the bleeding, and this pressure is to be steadily continued until all tendency to bleeding has completely ceased. I have never known this practice to fail, except in a few cases where the hemorrhage arose from the blood wanting its usual coagulating power, and in some children, where from the leeches having been applied to the neck, and more particularly where the leeches were of a large size, the necessary degree of pressure could not be employed. In the first class of cases, touching the orifice with the nitrate of quicksilver produces an immediate coagulation of the blood, with which it mixes, and thus plugs up the wound. Caustic may be in like manner employed in hemorrhages from leech-bites in children; and Sir Charles Bell has, in troublesome cases of this kind, stitched the lips of the wound together with a fine needle and thread, or the needle may be allowed to remain for some hours in the wound, and its thread twisted round it, as is done in making the twisted suture, and thus a firm and unyielding compress is formed in the wound.

By Scarifications.—There is no class of diseases where the effects of the local abstraction of blood are so well exemplified as in some of those of the Eye, in which a quantity of blood may be taken from the conjunctiva by the operation of "scarification."

The beneficial effects of applying leeches to the orifices of the different mucous canals, when depletion is required, is well established, and the operation of scarifying the conjunctiva, lancing the gums, puncturing hemorrhoidal tumours, and making incisions in inflamed parts, all give relief on the same principle.

Scarifying the conjunctiva is a most useful operation, and one of the few methods we possess of abstracting blood locally, strictly so speaking. Simple as may be its performance, there are still several circumstances requiring nicety in this operation, and which are necessary for its success; and in the common mode in which it is done, instead of doing good, it often irritates and produces mischief. This operation was known to the Arabians, who performed it by inserting the serrated edge of the beard of the common barley into the conjunctiva, the wounds thus made bleeding more or less freely. Long ago I used an instrument made on the same principle, consisting of a thin blade of steel, with a serrated edge well sharpened, and each tooth forming an acute angle with the blade. But the most safe and efficient mode of performing this operation is with a wedge-shaped scarificator now in common use. The lancet is a very unfit instrument for this purpose.

The principle of the operation is, by wounding the conjunctiva, to get as much blood as possible. The wounds should only be made on the palbebral, and never on the sclerotic, conjunctiva, as when the vessels on the ball of the eye are divided, the operation invariably excites much more irritation than the loss of blood does good. The wounds, therefore, should be limited to the conjunctiva lining the eyelids, and it is only on the inferior lid where the scarification can be properly accomplished, and the wounds or scratches should be made on that part of the membrane which is reflected over the cartilaginous tarsus. All its other portions are loose and unresisting, whereas on the tarsus the conjunctiva is kept stretched, and the cartilage affords a resistance sufficiently firm to admit of the ready division of the blood-vessels.

Before using the scarificator, you should completely evert the lower eyelid by the fore and middle finger of the left-hand, underneath the points of which is placed a thick dossil of lint, and this assists in keeping the lid everted,—absorbing the blood,—and also, by compressing the lid on the lower edge of the orbit, the blood is made to flow much more freely.

The edge of the scarificator is to be held perpendicular to the surface of the conjunctiva, and the weight of the instrument is of itself sufficient to make the wound deep enough. One scratch, for it ought not to be an incision, along the tarsus, generally answers the purpose, but several are sometimes necessary. You can, however, easily comprehend how one division of the same vessel should bleed as much as several. By retaining the compress on the everted lid, pressed moderately, it is often surprising the quantity of blood which is discharged, and the relief and benefit of the operation are generally in proportion to that quantity,—just as has been observed when speaking of the blood taken by leeches being in proportion to the turgescence of the vessels where they are applied.

It is worthy of remark, that the abstraction of blood by scarifying is never useful until the acute stage of the inflammation has passed. It is in the sub-acute, or chronic, or passive stage, wherein such local depletions appear so decidedly useful, in this respect resembling the relief in congestions from spontaneous hemorrhages. When the eye is suffering from an acute inflammation, the vessels of the palpebral conjunctiva are not much increased in number, and appear chiefly arterial, and when divided yield scarcely any blood. But when the second stage of the inflammation ensues, there is a great increase in the number and change in the colour of the vessels, the arterial capillaries being diminished in number, and the venous increased, while the bright red colour becomes of a more purple hue.

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LECTURES ON SURGERY,

DELIVERED BY

MR. WARDROP.

ON THE SANGUINEOUS SYSTEM.

ABSTRACTION OF BLOOD (CONCLUDED).

Curative Effects of Blood-letting,—in Fevers,—in Eruptive Fevers,—Scarlet Fever—Small-Pox,—Erysipelas, — in Inflammations,—in Congestions,—in Suppurated Parts,—in Sloughing Ulcers,—in Ulcerated Legs,—in Wounds.—Some Anomalous Effects of Blood-letting.—Concluding Observations.

On the Curative Effects of Blood-letting.

Having, in the foregoing lectures, endeavoured to explain most of the important circumstances connected with the subject of blood-letting,—particularly the differences in the effects of abstracting blood from the arterial and venous systems,—the differences in the effects of local and general bleeding,—the indications for employing each of these modes of abstracting blood,—the extent to which blood-letting ought to be carried, and how it is to be regulated,—and having also enumerated those states of the system wherein blood-letting is injurious,—before concluding this interesting subject, I propose to make a few observations on its curative effects, and glance over those various classes of diseases to which your attention ought to be particularly directed in the employment of this useful remedy.

In febrile diseases (the class of "pyrexiæ" of Cullen), blood-letting, as a general remedy, must be considered one of the most powerful, whether we contemplate its effects in the treatment of "fevers," properly so called, — in the "phlegmasiæ," where there is an inflammation of some particular organ,—or in the order of "exanthematous, or eruptive, fevers."

In Fevers.—In the treatment of fever there has been much controversy on the propriety of blood-letting, and which, like most other discrepancies in medical opinions, is, I believe, to be chiefly attributed to the observations of different writers not having been made under the same circumstances, and to there being no class of diseases that assumes a greater variety of type than fevers, not only in different countries and in different classes of the community, but even in different years and seasons in the same place. That fever which at one period, and in one class of persons, is mild, may, in a short time, assume the greatest severity; whilst that which at another period appears in a severe and inflammatory form, demanding most energetic depletion, may, at no very distant period, commence with typhoid symptoms, and require a perfectly opposite system of treatment. Hence all histories of febrile diseases, made at different periods, and at different places, present an unaccountable variety of character; and therefore, in the treatment of this class of diseases, all that you ought to attempt is to establish such *general* principles as shall be applicable to the different forms or types in which the fever may present itself; and here again we must trust to a judicious discrimination, and an experienced eye, for detecting the peculiarities of each case; as even in the same family, instances will occur of a fever assuming an inflammatory character in one of its members, and in another a typhoid form.

The practice of avoiding the use of all depletive means in the treatment of fevers, has been, until late years, very generally followed. Dr. HAMILTON first pointed out the essential benefit to be derived from the free use of *purgative* medicines, and our army and navy surgeons had many opportunities, during the last war, of establishing the advantages to be derived from a judicious employment of blood-letting in those fevers which, in different parts of the globe, had usually been considered as requiring an opposite system of treatment.

The objections to the use of blood-letting in fever were founded merely on hypotheses, and on the erroneous notions that such diseases had to run through a certain course—to have a certain duration, which could not be shortened, whence it became necessary that all resources of the system should be husbanded, in place of abstracting blood, or of adopting any mode of treatment which should cause a still further exhaustion of the vital powers.

Case.—It is not long since I had an opportunity of witnessing the fallacy of this doctrine in the case of a youth who was attacked with fever, and whom I accidentally saw just when he was brought from school, at the commencement of the disease. He complained of a violent headach, had a flushed countenance, a typhoid tongue, a hot and dry skin, and a rapid pulse. I immediately bled him at the arm, when in the supine posture, until he fainted, ordering him a dose of James's powder and calomel every four hours, alternately with a purgative. The physician who attended the family was afterwards sent for, and he visited the patient in a few hours, and when he heard the history of the case, and observed the character of the tongue, he expressed his decided opinion that the depletive system of treatment would be injurious, that the patient had all the symptoms of typhus fever, which would endure twenty-one days, and that it would be followed by such a train of symptoms of exhaustion and debility, that in place of blood-letting, the very opposite system of treatment ought to have been pursued. Contrary, however, to this prediction, the bleeding completely and permanently relieved the head, the skin and alimentary canal were powerfully operated upon by the antimony and calomel, and so early as the ninth day the febrile symptoms abated.

In Eruptive Fevers, the abstraction of blood, whether general or local, you will find in some cases a powerful remedy; and, as I have noticed in regard to fevers, it is not many years since blood-letting was first employed in the treatment of exanthematous diseases,—and from an impression that they also had to "run their course," and that the great exhaustion necessarily created by the disease, required all the resources and powers of the system to support the patient, in place of any further debility being caused by depletion.

Numerous facts have proved the fallacy, indeed the absurdity, of such a doctrine. There is no febrile disease, even of a specific character, such as small-pox, measles, scarlet fever, or hooping-cough, wherein blood-letting may not be advantageously employed under certain circumstances, particularly during the early stages of these maladies.

When noticing the injurious effects of blood-letting in *specific* diseases, I observed, that in syphilis and gout, besides the specific inflammation which forms the essential character of those complaints, there are often symptoms of another character, symptoms which arise from the presence of an idiopathic or common inflammation being present at the same time, and which inflammation is to be subdued by blood-letting. Now this observation is applicable to the phenomena observed in the eruptive fevers, and you will find that these diseases may be accompanied by inflammatory symptoms, or with an idiopathic inflammation in a particular organ, which requires a separate system of treatment.

In Scarlet Fever.—Blood-letting may also be resorted to in the early stages of this disease, particularly when there is a determination of blood to any particular part, as the chest and head. Sometimes the inflammation of the throat, the characteristic feature in this disease, is so severe, that much relief is obtained by a local bleeding, more or less profuse; but when any of the vital organs are affected, then venesection is preferable.

There is in this disease, as in erysipelas and other of the exanthemata, a notion with many, that patients cannot endure a depletive system, or that such is unnecessary for their treatment. It cannot be denied that, like most other diseases, the scarlet fever in many cases passes through a very mild course, having scarcely a symptom requiring any particular treatment; and there are other examples wherein the pulse from the very commencement of the disease is feeble, and the powers of life sink rapidly. You ought also to be aware, that cases of scarlatina do occur where severe inflammatory symptoms come on, and of that type wherein blood-letting is highly to be recommended. The additional vigour which the pulse acquires whilst the blood flows from the vein, will be an unerring guide for estimating the propriety of the measure, and the extent to which it should be carried.

Case.—A gentleman between fifty and sixty years of age was seized with shivering, succeeded by hot skin and other febrile symptoms. On the evening of the same day I visited him. His mind was restless and a good deal excited; his skin hot and burning, his tongue white and loaded, the pulse frequent, and he had tumultuous action of the heart. He had a flushed countenance, the tint of which, along with a slight redness of his throat, made me suspicious that he had an attack of scarlet fever. He was immediately bled at the arm; at first the pulse rose, and a considerable quantity of blood was abstracted before he became faint. Calomel, combined with antimony, and a purgative medicine, were then given alternately every two hours. Next morning the febrile symptoms were much subdued, but his throat had become very painful. Twenty-four leeches were now applied to the external fauces, with relief. In a few hours afterwards he was again bled at the arm, a slight return of headach, with fever, having come on. These symptoms never returned; a fetid slough separated from the tonsils, and he afterwards recovered daily, and was very rapidly restored to health.

From the treatment which was adopted in this case, and its decided success, doubts were entertained of its having been really a case of scarlet fever; but those doubts vanished when that disease made its appearance a few days afterwards in two children of his family.

In Small-pox.—The benefit of blood-letting, when the febrile symptoms are severe, or when inflammation affects any particular organ, is equally great. An intelligent surgeon in the army informed me that he made it a general rule, from which he had experienced the greatest benefit, always to bleed soldiers on the commencement of the fever preceding the eruption.

Case.—A lady was attacked with severe febrile symptoms, for which she was profusely bled, and with great relief. On the following morning it appeared that she was afflicted with small-pox, and her medical attendant at first expressed his regret for having had recourse to venesection. Such, however, was the mild progress of the disease, comparing it with that of many who were affected in the same town, that all were convinced the blood-letting had been highly beneficial, and had mitigated the febrile symptoms.

In Erysipelas.—When speaking of the effects of local bleeding, I remarked that its benefits were exemplified very strikingly in cases of erysipelas, by the profuse hemorrhage which followed incisions made into the inflamed integuments. Such a practice will, however, I am persuaded, be seldom found necessary, if blood-letting be had recourse to in the early stage of that disease.

From a supposed typhoid character of erysipelas, it was the general practice, and is still with some, never to deplete or pursue an antiphlogistic plan of treatment; and I well remember visiting a lady who was suffering from a very severe attack of erysipelas in the face, and finding at her bed-side a large tumbler of wine-and-water, and that she was taking as much bark as she could receive. By bleeding her freely, and repeating the operation three successive times at short intervals, along with purging and antimonial medicine, she rapidly recovered; and the medical attendant who first saw her, expressed his surprise at the treatment I had employed, remarking, that during a long attendance at a public hospital, he had never seen blood-letting employed in erysipelas, and adding, that nearly all the cases he had seen of that disease affecting the face and head had terminated fatally.

In erysipelas there is usually a peculiar feeling in the pulse, which is apt to dissuade the practitioner from employing blood-letting; the pulse is small, but more or less incompressible, and whilst the blood is flowing from the vein, it acquires more and more volume, and often a very considerable quantity is abstracted before a fainting state supervenes.

In Acute Inflammations.—In the treatment of all inflammations (the phlegmasiæ of Cullen) the abstraction of blood is a most powerful curative means, and, as I have already noticed when speaking of general blood-letting, whenever there is any organ under the influence of inflammation, and that inflammation is accompanied by febrile excitement, the abstraction of blood should be unhesitatingly employed; under such circumstances, the blood should be abstracted from the arm whilst the patient is in the recumbent position, until syncope is produced, and repeated whenever the pulse rises, and until the febrile symptoms are subdued.

Even after these symptoms have been subdued it may be found that there still exists some determination to a particular organ, such as the head, chest, or abdomen, in which case local bleeding should be resorted to. By the general blood-letting the increased action of the vascular system is diminished, but in most cases local bleedings are subsequently necessary to check the undue action of the capillaries of the inflamed part. It is always of importance, however, in the treatment of inflammation, that the general should concede the local bleeding. Every day you will meet with cases wherein local bleeding has been employed without benefit, and in which, when general bleeding is afterwards adopted, the symptoms at once subside.

In Chronic Inflammations. — When inflammation assumes a chronic, or passive, or subacute form, the abstraction of blood is an equally useful remedy as when inflammation is in its acute stage. The above terms have each been employed to denote the state of an inflamed part wherein there is no longer any febrile excitement, — no disturbance in the action of the heart and arteries, but where there is a change merely in the functions of the capillary system, and hence, as I have already remarked, it is in this stage of inflammation that local is usually preferable to general blood-letting.

In such cases I have been in the habit of recommending the frequent repetition of small bleedings in place of one or more large depletions, and I have often been both surprised and gratified with the benefit of this practice. A person afflicted with some chronic inflammation, and whose strength could not support anything like a severe depletive system, will often gain vigour and health during the daily use of two or three leeches on a diseased part.

Case.—A young lady, of feeble constitution, had a gland in the neck enlarge suddenly. It was tender to the touch, but she had no febrile symptoms. I advised her to apply leeches daily, beginning with four and diminishing the number as the swelling abated, which treatment, along with fomentations and poultices, greatly relieved her, and the swelling gradually diminished. But the leeches were employed no less than seventeen times on this as well as on another enlarged gland before all tenderness went off; and what surprised her relatives was, that at the termination of this treatment her general health and strength had improved, and she had regained flesh.

Case.—A girl, about six years of age, had a scrofulous affection of the second joint of the thumb. A considerable enlargement having taken place of the soft parts, with slight discoloration and tenderness, two leeches were daily applied for one week,—one during the subsequent week, and one every second or third day afterwards, until the swelling completely vanished; after which treatment her general health was greatly improved.

There are many inflammatory subacute affections which you will find yield to a similar system of treatment. There appears indeed to be a very different effect produced by small and frequent bleedings in such cases to that by larger depletions; and in adopting this practice you will have little difficulty in regulating either the number of leeches necessary to be applied, or the frequency of their application. At first the bites may bleed very profusely, whilst their future applications yield comparatively little blood, and their use should be repeated as long as the blood they draw affords decided relief. I need scarcely remark, that whilst this system of local bleeding is pursued, it is not meant to preclude the use of other auxiliary remedies.

In Congestion.—The observations I have hitherto made on the curative effects of blood-letting apply chiefly to the employment of it in the treatment of diseases of an inflammatory character. But there is another class of cases wherein the abstraction of blood is an equally powerful remedy, and in which the propriety and extent of the depletion are indicated by a different assemblage of symptoms. I allude to congestion or *plethora* of a particular organ or region of the body.

This state of congestion I have already endeavoured to point out is very different from inflammation; in congestion the vascular system, more particularly the veins of the affected part, being preternaturally distended with blood, whilst in an organ which is inflamed, there is a change in the condition of the arterial capillaries. A mere congestion of blood can be artificially produced in the arm by tying a ligature around it, and thus distending the veins. There is no alteration in structure thus produced, but merely an increase in the quantity of blood, which, if you could suppose the limb was removed from the body and immersed in water, would be washed away. Congestion, I have also observed, ought to be discriminated from an irregular distribution of blood, examples of which we have in flushings of the cheek,—the effects of friction on the skin,—the presence of a mote in the eye,—and in many of those headachs which are usually called nervous. Now in cases of congestion, bleeding should not be generally carried to the same extent as in inflammations, and the blood is to be removed either from the vessels immediately connected with the diseased organ or remote from it. Leeches on the frontal vessels, or the ethmoidal vessels ramified on the septum of the nose, or applied behind the ears, where an artery as well as a vein make their exit from the brain, or cupping the nape of the neck, are the modes best adapted for relieving congestion within the head.

Leeches or cupping may, in like manner, be employed on the parietes of the thorax and abdomen in congestions of the viscera; and leeches on the verge of the anus are particularly beneficial in abdominal congestions, from the circumstance I have formerly stated, of the connexion which the hemorrhoidal veins have with the portal system.

Whatever theory or explanation may be given, there cannot be a doubt of the fact, that many diseases of the thoracic chylopoietic, and uterine systems, are essentially relieved by the application of leeches to the feet; and this practice of removing blood from a distant part is equally remarkable in disorders of the head, these being often relieved by the escape of even a few drops of blood from the hemorrhoidal vessels.

There are other cases of congestion where blood-letting must be carried to a great extent, more particularly where the brain or chest is the seat of the disease, life then being often in more or less danger, and the only mode of preserving it being the abstraction of such a quantity of blood as to produce syncope.

Case.—A gentleman, about sixty years of age, and of a sanguineous temperament, was suddenly seized with giddiness, at which he was alarmed, and I visited him immediately. There was so little deviation from the natural state of his pulse, that I even hesitated whether to take some blood by venesection or by cupping. The former mode being determined on, he was placed in a reclining posture on a sofa, a wash-hand basin put underneath his arm, into which the blood flowed freely; his pulse soon began to rise, and an incompressible feeling remained in it, until a large quantity of blood was abstracted; at last it began to sink, but not until such a quantity of blood had escaped as I would not have ventured to take away, had not the character of the pulse and the plethoric appearance of the patient given me confidence. Except purgatives sufficiently freely to open the bowels, he took no other medicines. On the following day he felt so little the effect of the depletion, that he dined at a club, and on the following evening he was so well as to be able to attend his duty in the House of Commons. The blood he lost was accurately weighed, and amounted to no less than fifty-two ounces; a quantity many practitioners may have removed in cases of great urgency; yet, what was remarkable in this case, was that none of those debilitating effects were produced which might reasonably have been anticipated from so large a depletion, and what was most satisfactory, this patient continued several years after in most perfect health.

I have already remarked, when speaking of the *injurious* effects of blood-letting in paralytic affections arising from congestion in the brain, or when effusion of blood has actually taken place, that bleeding cannot be carried far in proportion to the severity of the symptoms; on the contrary, in proportion as the attack is severe, a lesser quantity of blood only can be removed with safety. That is, a person who has an attack of palsy, destroying at once the power of the upper and lower extremities of one side, and also that of speech, cannot spare so much blood as the same person could have done, and ought to have lost, previous to the attack, had its approach been observed.

In proportion to the severity of the injury sustained by the brain, so does the system suffer from the shock; and hence in the degree which the powers of life are diminished, so will the system be the less able to support the abstraction of a large quantity of blood.

Case.—A man forty-five years of age, whose habits were extremely dissipated, and who drank frequently to intoxication, lost suddenly the power of speech, and the whole of his left side became motionless. In this state I opened a vein in his arm, and after a very few ounces of blood escaped, his pulse sank, and on repeating the operation a few hours afterwards, his pulse again faded, after a very small quantity was removed. Having freely evacuated the bowels, and taking calomel every few hours, at last the mercury affected his gums, and a sharp ptyalism supervened, which was followed by a gradual restoration of the powers of speech, as well as of the use of the paralysed extremities. A seton was afterwards introduced into the nape of the neck; and I saw this patient upwards of four years after this attack, having recovered his speech, and that of the use of his side so perfectly, as to enable him to be employed in his business as a watch-maker.

When, on the other hand, the approach of a paralytic attack is foreseen, or even the symptoms slightly commenced, it is astonishing to what an extent blood-letting must sometimes be carried, in order to check the progress of the malady.

Case.—A patient called on me, complaining of a numbness in the muscles of the right arm, and a tingling sensation in the fingers, which symptoms he had first perceived on shaving himself that morning. His pulse did not appear much changed, but it was not easily compressed. The action of the heart was unnaturally vigorous; his countenance had a tumid appearance and a leaden colour, but he had no uneasy feelings in his head, though he had walked a considerable distance to my house. I advised him to return home in a coach, and to be immediately bled in the horizontal posture, and forty-four ounces of blood were abstracted before syncope came on. The pulse soon began again to rise, and he was largely bled a second time twelve hours after the first bleeding, and also until he fainted. In forty-eight hours after the first bleeding, the action of the heart and arteries had greatly increased, accompanied with feelings of stupor and giddiness, notwithstanding his bowels had been very freely evacuated; he was therefore again bled at the arm till syncope came on, having lost in the three bleedings no less than a hundred and six ounces of blood! A few doses of calomel, which had been given along with strong purgatives, in a few days affected his gums, and created a good deal of mercurial fever, but his strength rapidly recovered after this went off, and in a few weeks all numbness left his arm, and its motions were so completely restored, that he could use a pen as well as before his illness.

In Suppurated Parts.—It is usually considered that when an inflamed part has advanced to suppuration, the future treatment ought to be altogether directed to the healing of the abscess, for which poultices and free incisions are frequently employed.

It is true, that usually when the contents of an abscess are discharged, the accompanying pain as well as inflammation abates, but this is not the case on all occasions; and it is in such cases, and under such circumstances, where I have found local blood-letting essentially useful.

In most cases of cellular as well as glandular inflammation, the purulent fluid which is collected and forms the abscess, does not make its escape if left to nature until all the circumjacent swelling and inflammation have abated. But if the matter has been artificially evacuated, and the surrounding swelling and inflammation are unsubdued, then the daily application of leeches to the inflamed integuments you will find most useful; and whilst the inflammatory symptoms are thus subdued, the suppurative process will be observed in like proportions to diminish.

Case.—A youth, when bathing, trod upon a broken bottle, which cut the sole of the foot deeply. I saw him about four months after the accident. There were considerable tumefaction and tenderness of the soft parts around the wound; almost the whole extent of the cut remained open, and there was a copious puriform discharge, which appeared to ooze from a cavity corresponding in extent with the hardened and swollen soft parts. Four leeches were daily applied, and with a common poultice and perfect rest, in eight days the wound was closed; the repetition of the leeches a few times, at more distant intervals, completely removing all swelling and tenderness.

When a succession of abscesses has formed in any part, and when sinuses have been extending, as it were, step by step, the inflammation of the surrounding soft parts can be completely checked by local bleeding; and in this manner have I often been able, by the almost daily application of leeches, completely to conquer the inflammation, and thus check the formation of new abscesses and the extension of sinuses. I have long thought that it is by the bleeding from the incisions made for laying open sinuses that the good effects of that practice are chiefly derived.

It is surprising to what an extent bleeding can be employed, or rather how often a small number of leeches can in such places be applied with the most decided benefit; and in place of patients being reduced by such a practice, the effect of the depletion, by alleviating disease, seldom fails to improve the patient's health.

In Sloughing Ulcers. — Whenever an ulcer, whether it be the consequence of a wound, or caused by some specific virus, such as that of syphilis, assumes a disposition to slough, it has been usual to employ stimulants, both as internal as well as external remedies. Now there are many cases of this description wherein an opposite or depletive system of treatment may be advantageously employed; and I first observed the extraordinary effect of depletion in a case of sloughing chancre, from which a profuse hemorrhage took place.

Case.—Early one morning I was sent for to visit a gentleman who had lost a great quantity of blood during the night from a sloughing chancre, which had extended into one of the corpora cavernosa. To arrest this hemorrhage I immediately bled him at the arm till he fainted; after which the hemorrhage from the sore did not return, but a change took place in its character, which I little anticipated. The sloughing process was completely checked, the slough separated, and the wound granulated and cicatrised in the most healthy manner.

Reflecting on the effect of depletion in such cases, we have an incontrovertible proof that sloughing sores are at least not always to be attributed to a diminished vigour or typhoid state of the system, or from any more virulent quality of the specific virus, but to an excess of inflammation arising from the peculiar state of the system or constitution of the patient, and this inflammatory state is to be subdued by an antiphlogistic system of treatment, independent of any subsequent treatment which may be necessary for the cure of the specific disease. Hence, as is well known, in cases where the syphilitic sore shows a disposition to inflame much, or to slough, the exhibition of mercury is prejudicial, and never ought to be administered until all local as well as constitutional excitement is subdued.

In the class of cases to which I allude, besides blood-letting, opium ought to be freely given, and one or more grains may be taken every few hours, until the symptoms are relieved. The same observations on the curative effects of blood-letting in sloughing syphilitic sores, apply to those wounds where it is not unusual to see the soft parts slough or mortify from the violence of the inflammation consequent to the injury. In such cases too there is a period when the best effects will result from local or general blood-letting, and that where from a sloughing appearance of the wound depletion is not commonly employed.

This useful effect of abstracting blood has been established in the most satisfactory manner in the treatment of *hospital gangrene* by Mr. Boggie, an intelligent army surgeon, who met with many examples of that formidable disease in military hospitals during the Spanish campaigns, and for which he found venesection the most powerful remedy.

In Ulcers of the Legs.—This plan of treatment is equally applicable to the inflamed integuments around an ulcer, and I am constantly in the habit of applying repeatedly a small number of leeches, and with the best effects, in the immediate vicinity of ulcerated surfaces, and where general bleeding is not indicated.

I may, however, here mention, that there are many ulcers of the lower limbs, which though not accompanied by those febrile symptoms which point out the propriety of general blood-letting, are manifestly benefited by the abstraction of a moderate quantity of blood by venesection. I was first led to adopt this practice by having remarked a decided benefit in some ulcers from the rupture of a varicose vein accompanying them, and from the benefit derived by bleeding animals afflicted with any ulceration, or humour, as it is commonly designated. And also from such ulcers being usually the effect of some constitutional disturbance, which would have been relieved by venesection.

By adopting the practice of bleeding patients with ulcerated legs, whenever they were admitted into the hospital, and pursuing an antiphlogistic regimen, and with no other local treatment than a cold-water poultice, with the horizontal posture, I have been much surprised with the rapidity of their amendment, compared with the tedious and troublesome application of plasters and bandages.

In Wounds.—The abstraction of a quantity of blood is, I have already mentioned, to be had recourse to, before and after most surgical operations; and when operations prove unsuccessful, I have also stated, in by far the majority of cases, the patients die of inflammation of some internal organ. Bleeding therefore will, when early resorted to, and carried to a proper extent, have the effect of always checking any inflammatory disposition, and it will also be the means of securing the healing of the wound by adhesion, when such is desirable. The modes of abstracting blood for such purposes are, either to take away a quantity before the operation,—to allow the divided vessels to bleed during the operation—or to employ venesection after the operation. Now all these *three* methods ought to be employed separately or conjointly in particular cases.

When an operation is to be performed on a plethoric subject, and an operation where little blood can be lost, more particularly in operations for *cataract*, when no bloodvessel is ever divided, then it is very judicious to bleed the patient on the morning of the operation; any future bleeding, of course, depending on the subsequent symptoms.

When there is any chance of bloodvessels being divided during the operation of such a size as to admit of any wished-for quantity of blood to flow from the wound, then I have usually been in the habit of *not* bleeding the patient previous to the operation, but of allowing such a quantity to escape from the divided vessels as appeared expedient.

I have already dwelt on the advantages which are in most cases derived from a plentiful sanguineous depletion during operations, and of the complete check which this gives to the accession of the febrile symptoms, and to the danger of inflammation in the wounded parts; and so strongly am I impressed with the utility of this practice, I have generally remarked that all those patients who have lost much blood during operations from the wound, seldom require any subsequent bleeding, and the wounds usually heal by adhesion.

When under any circumstances, whether the patient may have lost blood previous to an operation or during it, febrile symptoms do supervene, attended by more or less *local* pain, then should blood be freely abstracted, and the bleeding repeated until such symptoms are completely subdued.

I formerly noticed, that if a wound be not forcibly closed and tightly bandaged, and vessels of any considerable size have not been tied with ligatures, then whenever the slightest inflammatory disposition supervenes, a hemorrhagic effort takes place, and a bleeding from the wound ensues, which discharge never fails to relieve the inflammatory state of the parts. From observing this phenomenon, I have been led not to dress wounds and close them up in the usual manner; and whenever any bleeding from them does take place, never to use any local means to suppress it, but to leave the vessels as it were unmolested, and to pour out such a quantity of blood as may be requisite to relieve the inflammatory state of the wounded parts. This system of management generally secures the closure of the greater portion of the wound by adhesion, when its edges are in contact, and when the wound is not of such a nature as to render it impossible. As I have already remarked, it so moderates the consequent local inflammation, that the suppurative process is greatly diminished both in severity and in extent. The same general remarks apply to wounds accidentally inflicted, and all kinds of injuries; and some observations on these points I have in part anticipated.

Hitherto great attention has been directed to the useful and curative effects of blood-letting, but it is natural that you should inquire what are the consequences of such bleeding not being resorted to under all the various circumstances which I have pointed out, as indicating the propriety of such treatment. You will dail meet with opportunities of noticing the changes of structure which take place in every organ of the body, in consequence of inflammations being allowed to advance,—inflammations which, had they either been early detected and treated by depletion, might have, in all probability, been subdued, and thus any permanent change of structure of the inflamed part completely arrested.

There are, no doubt, many examples of inflammatory diseases, which have been completely relieved without blood-letting, some of them, when left to nature, running through a particular course, and leaving the affected organ unchanged; and there are others which are checked by the exhibition of those internal and other remedies which influence and subdue the action of the arterial system. But there are many affections where the propriety of blood-letting has been indicated, though not adopted; and where, in consequence, the foundation has been laid of some substantial structural disease. I am indeed convinced, that in almost all those diseases which are, at their commencement, attended by a disturbed action of the vascular system, a much more rapid and efficient abatement of the symptoms would result from venesection, pursued even to a very moderate extent, and the whole system suffer a much less subsequent debility, than by the free use of purgatives and diaphoretics, and a long continued perseverance in an antiphlogistic treatment.

Some anomalous Effects of Blood-letting.

There is a curious effect of bleeding which was first remarked to me, in the following instance, by Professor RUSSELL of Edinburgh, and I am not aware has been noticed.

Case.—A lady of a plethoric habit was very liable to sudden and severe congestions of blood in different parts of the body, most frequently in the lungs: the abstraction of a quantity of blood was indispensable. The moment a vein was opened she not only began to experience relief, but felt an instantaneous exhilaration of spirits, like one intoxicated. Mr. RUSSELL repeatedly witnessed this very singular effect in the patient, and a medical friend of his witnessed an effect somewhat similar in another person.

Bleeding, too, not only increases the action of the bowels, but it promotes the mercurial action. Dr. FORDYCE used to say that in some cases of constipated bowels, you ought to open them with a lancet; and the late Mr. GIBSON of Manchester was in the habit of bleeding largely when he was anxious to influence the system rapidly with mercury.

The remarkable effect of abstracting blood from domestic animals under different circumstances and for different purposes, is well worthy of remark. I have mentioned the exhilarating effects which some persons experience from the loss of blood, more particularly when the viscera of any of the great cavities, as the head, or the system in general, is in a state of congestion. Similar effects may be observed in horses who get into too high condition, as it is called, in which state a heaviness and want of activity supervene, which is relieved by blood-letting, and they acquire a fresh vigour.

An acute observer informed me that he has often found, that if a pointer is bled on the morning of the day previous to hunting, the fatigue he can endure is infinitely greater than another dog in the same condition who has not lost blood.

The practice of bleeding calves in order to render the muscles paler, is also another purpose for which blood may be abstracted.

It is not an unusual, though it is a very erroneous notion, that if a person repeatedly loses blood, it becomes *a habit*, and he requires ever afterwards to be occasionally bled. But surely if a patient is affected with an inflammatory disease, his sufferings should be alleviated by blood-letting, when it is perhaps the only certain remedy.

There is a practice with some people of losing blood *periodically*, and that generally in the spring and autumn, and it is by no means improbable that, if these periodical bleedings were in such persons neglected, some injurious consequences might follow.

Concluding Observations.

Having now concluded the observations I proposed to make on the subject of blood-letting, allow me to express a hope, that notwithstanding the great extent of the subject, I have not omitted the consideration of any very important point. I have made every effort in my power to arrange and methodize the various topics on blood-letting contained in these lectures, and have been collecting the materials of which they are composed for many years, embracing every opportunity of putting the different doctrines, which I have endeavoured to inculcate, to the test of experience in diseases of all organs and of all textures, and also of comparing my opinions with the experience and observations of others. There are many remarks on blood-letting, as applicable to the treatment of particular diseases, to be found in the writings of various authors; but nowhere has the subject been discussed in a general and comprehensive manner; so that I have not had the advantage of a reference to authorities to serve as a guide, or to assist me in arranging the great mass of materials which this extensive subject embraces. I have carefully avoided entering on the numerous and important discussions of theoretical and speculative doctrines, and I have only brought before you facts, and simple inductions drawn from them. Almost every observation on blood-letting which I have made is, I am convinced, in accordance with the experience of the generality of practical men. I allude to those who themselves perform the operations necessary for the abstraction of blood, for I contend, that it is perfectly impossible for such as do not use their own judgment in employing blood-letting, and in regulating its extent by the effects it produces whilst the blood is flowing from the vein, to form any correct notions, or have any enlarged views on this subject. He who is in the habit of prescribing the abstraction of particular quantities of blood, in like manner as he may be accustomed to write a prescription for a dose of medicine, must possess a very incompetent knowledge of all the advantages which are to be derived from this most powerful remedy.

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LECTURES ON SURGERY,

DELIVERED BY

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ON SURGICAL OPERATIONS.

Treatment, previous to Operations, of the Digestive Organs—Influence of Seasons—Atmosphere—Times of the Day,—Mode of Conducting Operations—Choice of Room—Light—Operation Table—Instruments—Assistants—Modes of alleviating Pain.

From the observations which have been made on the peculiarities in the constitution of different individuals, and the varieties of temperament and age, I come now to point out the treatment which should be employed previous to performing operations under all these different circumstances. I have already enforced the propriety, indeed, in many instances, the necessity, of adopting such a plan of treatment as shall ensure the best possible state of the general health of the patient before submitting to a surgical operation; and by attention to which you may be enabled in many instances to ensure a satisfactory result, where, under other circumstances, and from want of due care, the operation might have failed. But in every instance you will also find, that such a system of preparation will tend greatly to accelerate the patient's recovery, and the healing of the wound, and to be convinced of the propriety of this course, it is not requisite that you should see it exemplified in the capital operations, for the lesser operations will afford you abundant proofs of its advantages.

When the propriety of an operation is determined on, the first step to be taken is, to inquire into the constitutional peculiarities of the individual, and to examine, in succession, the state of the digestive organs, of the circulating system, and of the nervous system.

Treatment of the Digestive Organs.

You will seldom meet with a patient whose chylopoietic viscera are in every respect healthy, and even although there is not any very marked derangement, it is a good general rule to purge the bowels moderately, for one or two weeks before the operation is performed. For this purpose a *colocynth pill*, with half a grain of *calomel*, may be given morning and evening; or only one pill may be given each day when more than that appears to operate too briskly. If this pill do not act sufficiently, then may be given, in addition, every second or third day, a common *senna draught* or a dose of *castor oil*. In the majority of cases, however, you will find some marked imperfection in the digestive process, and a more extended course of purgatives becomes necessary.

In the use of *purgatives* I have found the greatest advantage from always keeping in mind the important distinction between purging and evacuating the bowels. The alimentary canal ought to be purged with great caution, but you can never err in, at all times, evacuating the feculent contents. Hence it is that many people will tell you, they cannot bear purging, whilst, if the same person can procure, by medicine, a plentiful evacuation, he finds more or less relief. In order to produce these different effects by the class of medicines called "purgatives," the nicest discrimination and management are necessary. The same medicine, and taken in the same dose, will produce very different effects on the same individual at different times, and under different circumstances; so that a great number of things must be taken into consideration in the use of purgative medicines. On this subject, you ought to study with care the work of Dr. Hamilton, of Edinburgh, a work which constitutes one of the most valuable additions to practical medicine that has for a long time appeared. In that work Dr. Hamilton has not only pointed out a number of diseases curable by purgatives, but the general principles which he has established for administering them, are such as you will find of extensive utility in the treatment of almost every case of disease that can come under your care.

I may mention generally, that in the use of purgatives it is essential to discriminate in each particular case which of the chylopoietic viscera is deranged, and to determine which of them (when there are several deranged) should be first corrected. In many instances it is the stomach which is disturbed, primarily; in others the biliary secretions; and in others the smaller or the larger intestines. Each of these requires a distinct treatment. I meet with many instances where, from experience, I can with confidence prescribe one or other purgative; but in other cases there is great difficulty; and in all it is extremely difficult to explain the symptoms by which we are to be guided in forming an opinion. There are some observations, however, which I think you will find useful when forming a diagnosis.

When the *Stomach* itself is loaded either with unnatural secretion or with undigested food, there is generally sickness or vomiting, and the whole surface of the tongue is covered with a brown crust. Accompanying this state there is a want of appetite, and the lower portions of the alimentary canal perform their functions imperfectly. Under such circumstances I know of no more useful remedy than an emetic, and always prefer a combination of *ipecacuanha* and *emetic tartar* for this purpose. One ounce of the *wine of ipecacuanha* with one drachm of *antimonial wine* generally answers well. An emetic is usually the first part of the treatment a man undergoes when he is put into "training" for any athletic purpose.

When the *Biliary Secretions* are deranged, it is generally denoted by a peculiar whiteness or milky colour of the tongue, and sometimes by a frothy appearance; and it may also be observed, that the size of that organ, as well as its colour, is often altered in different diseases, a circumstance which merits your attentive observation. In biliary affections you will often find the tongue very large, and in place of being convex in its middle, it becomes concave, and increases in breadth. I am not aware that medical men have paid much attention to the various changes in the *bulk* of the tongue, but observations on this alteration, along with other symptoms, are important in investigating the diseases of the chylopoietic viscera. Affections of the biliary secretions are also characterized by an impaired appetite, thirst, or a clammy sensation in the mouth, irregular evacuations from the rectum, turbid urine, sallow skin, restless nights, irritability of temper, and moral depression. In such cases two or three grains of the *mercurial pill*, combined either with the *extract of hyoscyamus*, *poppies*, or *rhubarb*, may be given every second night, and a *senna draught* every alternate night with the pill. Or in place of the blue pill, one grain of *calomel*, or three or four grains of *mercury* with *chalk*, singly, or combined with *James's powder*; or either of the above extracts may be taken in like manner.

It is often a nice point to determine how far, or to what extent, such a mercurial course ought to be pursued. With many people a few doses of calomel are highly useful, but if more are taken, the digestive organs, particularly the stomach, are deranged, and the whole frame becomes irritable. Mercury in some constitutions, particularly the gouty, has often a great influence on the heart's action, and in such instances it ought to be employed with caution. Other people improve much under the action of mercurial remedies.

In the class of cases to which I have been alluding, besides a well-regulated alterative course, considerable benefit is often derived from the use either of alkalies or the mineral acids combined with bitters. Five grains of the *carbonate of soda* or *ammonia*, with an ounce of the *infusion of cascarilla* or *calumba*, and two or more drachms of the *infusion of rhubarb*, was a favourite formula of the late Dr. Baillie, and I am much in the habit of using it myself. The mineral acids may be given either with a quantity of the *syrup of roses*, *orange-peel*, or *Tolu*, in sufficient quantities to acidulate one or two ounces of water, or bitter infusion, taken two, three, or four times a day.

When the *Large Intestines* are loaded, a different class of symptoms from those which have now been mentioned, indicate such derangement. The abdomen becomes tumid; there is an increase of adipose matter generally, and a diminution of the muscular fibre; the skin becomes sallow, and the limbs feel flabby and soft; both the mental and physical powers lose their wonted energy; there is sometimes headach, vertigo, or giddiness; the appetite, in place of being impaired, is sometimes voracious, and is always irregular; the patient is apt to fall into a profound sleep after his meals, particularly after dinner; he complains also of flatulency and acidity, and his nights are very restless and unrefreshing; his bowels act irregularly, but usually are constipated; the urine is turbid, and in small quantities, depositing a copious brick-coloured sediment.

I have almost always observed in such cases, that, besides other appearances in the tongue, the middle and back parts of it are coated with a dark-brown fur. I have often found this fur at the back part of the tongue make its appearance some time after an operation, when the patient's bowels had been purged previous to it, and when he had even been powerfully depleted after it. It is of great importance to be aware of this circumstance, as such congestion in the bowels is often accompanied by a number of severe symptoms, which will not yield to any other remedies except those which act on the large intestines.

Besides these symptoms, there is a variety of affections which arise from this loaded state of the alimentary canal, of which it would be out of place to speak here. Suffice it now to observe, that the sympathetic affections arising from this cause, have been very fully detailed in Dr. Hamilton's excellent work,—a work to which you ought constantly to refer in investigating this class of diseases.

Whenever there is reason to suppose that the large intestines are preternaturally loaded, you ought to prescribe those purgative medicines which are known to act chiefly on that part of the alimentary canal. You will find Hamilton's work full of important information on this point, and his observations are worthy of serious attention. *Aloes*, *senna*, *castor oil*, and *rhubarb*, are the chief medicines to be depended upon, and these are to be combined with others, as well as with each other, to produce the desired effect. A couple of the *aloetic pills*, taken two or three times a day, and a *senna draught* taken occasionally, often have the effect of removing matter from the large intestines which had long been collected. *Castor oil* too, along with the *aloetic pills*, often brings away scybilæ from the bowels, and much advantage is also derived from the use of injections.

It is almost incredible how great a quantity of feculent matter is, in some instances, thus removed, and this purgative system is to be pursued as long as either the quantity or the quality of the alvine discharge continues unnatural. I may also observe, that, after the administration of a course of purgatives, it is often proper to give some alterative medicine, such as has been formerly alluded to, and to prescribe the system of diet which has been so well pointed out by Mr. Abernethy in his work on the digestive organs.

It is of primary importance to attend to a patient's mode of living for some days previous to an operation, and more particularly on the day of the operation; for if the stomach be loaded, the interruption which the mental excitement causes to the process of digestion, will tend to aggravate any subsequent febrile action.

Bleeding has also been recommended before some operations, and it may occasionally be adopted with propriety, more particularly when the patient is plethoric, or where there is any other reason to apprehend subsequent fever or inflammation. But as, in most cases, it is in our power to allow any quantity of blood to flow during the operation, I have in general taken that opportunity to abstract whatever quantity may be deemed requisite. Almost the only exception to this rule is the operation of cataract, wherein no bloodvessel is wounded. Hence it is a common practice to take away some blood the day previous to that operation, though I have always preferred to watch the pulse after it has been performed, and, immediately on its beginning to rise, to abstract as much blood from the arm as will produce syncope.

Influence of the Seasons.

The French have paid much more attention than the surgeons of this country to the influence which different seasons of the year, different states of the weather, and different periods of the day, have in modifying the effects of operations.

That the constitution of man is influenced or modified by the different seasons of the year, like the rest of the animal as well as the vegetable kingdom, no one doubts, and it is easy to conceive that operations performed at these different periods will, in some way or other, modify their effects. The general rule which you ought to follow is, to avoid the extremes of cold in winter, and of heat in summer; and I myself prefer, when it can be made a matter of choice, to perform operations in the months of spring and autumn. You must not however imagine, more particularly in this island, that the weather is always favourable during these seasons. On the continent the climate is much more uniform than with us, and general rules founded on that uniformity are not applicable altogether to this climate; and hence the just stigma which for this, as well as other causes, has been cast on a system which has been practised in public hospitals, of postponing operations for the advantage of a large assembly of students!

Different States of Atmosphere.

I am quite convinced that the state of the weather is well worthy of consideration, in deciding on the period for operations. You may generally observe, that in Britain there are tracts of particular kinds of weather; that there is, for example, a tract of one or two weeks of rainy weather, which is followed by a tract of dry weather; or it may be perceived, that the wind remains in a particular quarter generally for a certain number of days. A tract of dry weather is preferable to one of rain, or a period which is marked by a humid and warm state of the atmosphere; for when the atmosphere is in this latter state, the human body is particularly subject both to febrile and other diseases.

As far as weather influences the body, there is no period in which the depression of the spirits, and the diminution of our physical vigour, are so great as during the prevalence of easterly winds—a state of atmosphere which is extremely common in this country. The whole vegetable creation seems to cease in growth when we have the wind from the east and north. It is, therefore, always advisable to avoid any important operation when such winds prevail.

Different Times of the Day.

With regard to the time of day most favourable for operations, the French have also bestowed great consideration, and they decidedly prefer an early morning hour. Several advantages result from following this precept. Besides, the patient's mind having rested from its hours of anxiety, it is of great advantage to the surgeon to get so important a duty performed early in the day, and before other objects come in the way to distract his attention; but perhaps the chief advantage is derived from the opportunities which day-light affords the surgeon of watching the state of the wound, and arresting any hemorrhagy, an accident which, when it occurs during the night, though only in a trifling degree, never fails to alarm the patient, and thus materially interferes with his repose.

Mode of conducting Operations.

I may begin this part of the subject by observing, that in conducting an operation, the surgeon ought himself to attend to all the requisite minutiæ. He should, previous to the day of operation, see that there is a fit chamber for its performance, that the light of the room is adequate, and that there is a proper table or chair for the patient to be placed on during the operation, and a proper bed for him after it.

With respect to the *light*, it is always essential that he should consider well beforehand the position in which the patient is to be placed, and his own position, that these may be so arranged as to produce no shade to interrupt any step of the operation being distinctly seen. For this purpose, he must likewise pay attention to the arrangement of the places for assistants and by-standers.

The next thing to which attention ought to be directed, is the *position* of the patient. Surgeons are often in the habit of performing some operations with the patient in the erect posture, which could be executed much more advantageously were they placed in a horizontal position, on a table or sofa. In all operations, where much steadiness on the part of the patient is required, or where he is to suffer much pain, I find great advantage from securing him on a table. The table should be firm and strong, and, for most operations, you will find one of six feet in length, two in breadth, and three feet high, answer the purpose. There are some particular operations wherein great nicety in the choice of the table is necessary, but these will be pointed out in their proper place. The table should be covered with a few folds of blanket, and there should be proper pillows to support the head. I also find great advantage from having an inclined plane, like a reading-desk, on the head of the table; and instead of the common pillow, half a small cylinder of wood answers particularly well, placed under the neck. It keeps the head and neck securely in one position during operations in these regions—an object which it is difficult to accomplish with a common pillow. There are some operations wherein a proper chair is sufficient for the security of the patient, more particularly those on the eye, nose, throat, &c.; and a chair ought to be preferred, when admissible, as it appears less formidable to the patient. In performing operations on infants, great facility and security are afforded by placing the trunk of the body and limbs in a linen bag, open at both ends, and sufficiently tight to keep the arms close upon the side, and prevent the limbs from bending.

The *Bed* for the patient should be well chosen, and should consist of two hair-mattresses in preference to a feather-bed, and placed in a proper part of the chamber. It is a good general rule, to make the patient lie one or more nights in the bed which he is to occupy after the operation. The advantage of this is, that he is enabled to sleep more tranquilly, from being accustomed to the bed. When it is necessary that the patient should remain in any particular position after an operation, or continue in one position for a considerable time, it is then advantageous to attend more rigidly to the previous arrangement of the bed, and it is proper for him to sleep in it longer, or even to make him lie, for some time, in the position in which he will be required to remain after the operation.

I received this useful practical lesson from Mr. George Young, than whom I never knew any individual who practised surgery with greater sagacity, observation, and intelligence. It is particularly applicable to cases of operation on limbs, such as for the removal of the moveable bodies which form in joints. In such cases Mr. Young not only placed the patient in bed for some days *previous* to operating, but he even put up the limb in the splints and bandages which were to be applied *after* the operation.

It is an excellent rule not to confide to others the selection and arrangement of the instruments and apparatus necessary for an operation. The operator himself ought to plan every step of the operation, and you will find it a kind of rehearsal to make a list of everything required, and yourself to place and examine every necessary instrument. This enables you to dwell and reflect on every possible point relative to the particular case, so that when you come to the actual performance of the operation, in place of confusion and delay, which so often occur in public hospitals from the surgeons confiding to others, the whole will be conducted systematically, and everything like hurry and bustle completely avoided.

Instruments.—All the instruments ought to be laid out in proper order, and covered over, so that the patient may not witness the preparations which are required. Pains ought also to be taken to avoid all exhibition of blood, as the sight of that never fails to create disquietude in the minds both of the patient and his surrounding friends.

The necessary preparations should be made as far as possible, without the knowledge of the patient; and there is nothing the surgeon should so much avoid, as by his dress, to impress him with an idea that the operation will be attended by much bloodshed. It used to be a very general custom, and one which still I fear prevails with some, more particularly in public hospitals, that the surgeon attires himself in such a dress as to give rise to an impression that he is about to perform the duties of an executioner rather than those of a benefactor! On such occasions it is easy to contrive so to dress yourself that any small quantity of blood which may be spilt shall not be conspicuous.

The Assistants.—I have already urged that it is of great importance to guard against anything like bustle and confusion during the performance of operations. These are to be avoided by a strict attention to arranging the duties which assistants have to perform before the operation is commenced. Want of attention to any circumstance, however trivial it may seem, is apt to disturb the calmness and tranquillity of the operator; and though it may not always be observed, yet any appearance of hurry will also create more or less agitation in the mind of the patient. Each assistant ought to have his particular duty assigned to him, and you will find it a good rule to assign to each his particular office, before the patient is brought into the room where the operation is to be performed, as this not only prevents delay, but all appearance of confusion, which occurrence would at that time not only alarm the patient, and protract his sufferings, but would also, more or less, distract the mind of the operator.

Whenever an operation is to be performed, however trifling it may appear in a medical point of view, it is of great importance always to have a sufficient number of assistants. You ought, indeed, to calculate the number of *hands* which may be required at any one period of the operation, and it is an excellent plan to select the number which may be requisite, giving each assistant the necessary instructions before the patient is brought into the room. When things are thus methodically arranged, much time is saved to the operator, a great deal of anxiety to the patient, and the whole operation is completed without the slightest confusion or appearance of hurry. Besides an assistant to take charge of the instruments and another to manage the sponges, it is very useful to have a sufficient number to secure the patient perfectly; for however courageous many persons may be before the operation, they often feel disappointed, as regards the degree of pain, and the time occupied in performing it, and the mind becoming fatigued and irritable, the sufferer has no longer the power of controlling himself, and is unable to remain steadily in the same position. You ought therefore to trust alone to assistants in order to secure the patient's immobility. It is also a prudent measure never to allow any unprofessional bystanders to be present during an operation, as such persons are very apt to become agitated and alarmed, and more or less to interrupt the operator, as well as to discompose the patient.

It is always advisable never to converse with patients, or reason with them, during the performance of an operation; the time to fortify and tranquillize the mind ought to be before it is commenced. It is proper, likewise, to give an explanation to the patient of our own belief as to the probable duration of the operation and of the degree of pain which he is to suffer. If it be an operation wherein the pain will in all probability be trifling, endeavour to impress that on his mind; whereas, if he be to endure severe and protracted pain, it is much better to give him a correct impression of what he is to suffer. The effect of acting in this manner I have generally found to be that, with patients of the former description, is saved a great of deal unnecessary fear, whilst you enable those of the latter description to fortify their minds against that which would have cost them much more agitation and excitement had they not been thus prepared to meet the evil.

Modes of alleviating Pain.

Besides using every endeavour to tranquillize the patient's mind before an operation, there have been various means proposed to alleviate his immediate sufferings or to diminish the pain of operations. This may be accomplished by the internal exhibition of opium, a large dose being given half an hour, or even for a shorter period, before the operation, and repeated immediately after it. The opium given before the operation is best exhibited in the form of *laudanum*, a full dose of which, not less than 40 or 50 drops, may be exhibited in a common saline draught, as in this form its effects are most speedy, and it is less likely to disturb the stomach.

After a severe operation I usually give *opium* in its solid, crude form, and I think there is great benefit derived from exhibiting it combined with *calomel.* You may in general give two grains of opium with five or six of calomel, in the form of a pill, immediately after the patient is put to bed, and everything about the room has been arranged, so that his repose may not afterwards be disturbed. Calomel seems to have its action on the biliary organs, which are always more or less deranged from the mental excitement which the patient has suffered, both previous to and during the operation. It thus diminishes, or even prevents, the accession of any subsequent febrile action.

Often, however, it happens, that notwithstanding the free use of opium, the mind of the patient is far from being tranquillized, and this mental inquietude renders any effects of the narcotics to alleviate the pain of the wound altogether ineffectual. It is, therefore, a great desideratum in surgery to discover a mode by which the pain of surgical operations could be either alleviated or diminished.

Case.—A young woman applied to me some years ago to have a tumour removed from her head, being convinced of the necessity of the operation from the opinions she had received from several eminent surgeons. The tumour was of a very moderate size, was attached to the cranium, but could easily be removed. When I first attempted the operation, the moment the scalpel touched the skin she leaped from her chair, and would not permit me to proceed. In a second attempt she allowed herself to be placed upon a table, and her arms and legs to be secured by an ample number of competent assistants, notwithstanding which, the instant she perceived the instrument touching her, with a convulsive effort she wrested herself from their hands. Her mind now became exceedingly distressed, finding that there was no other mode by which she could get rid of the tumour. At the same time she was strongly impressed with the necessity of the measure. Under these circumstances she repeatedly urged me to contrive some method of securing her, so that the operation might be performed with safety; and after again and again reflecting on the subject, it occurred to me that if I could induce a state of syncope, there could be no reason why the operation should not be performed while she remained in that state. To this proposal she readily acquiesced, and after every necessary preparation, I opened a vein in her arm whilst she remained in the erect posture, in order that fainting might be produced with as little loss of blood as possible. It was not, however, until fifty-four ounces of blood had been withdrawn that she fell into a state of complete syncope. Immediately after this I proceeded to the operation. As you may suppose, it was performed with unusual facility, no blood coming from the wound to interrupt the dissection. After the tumour was removed, and the diseased bone cauterised, she was carried to bed, where she soon recovered from the syncope; and so unconscious was she that the operation had been performed that she would not give credit to our assurances until a mirror was brought to her in order that she might *see* a reflection of the wound. An account of this case is published, with some observations thereon, in the 10th vol. of the *Medical and Chirurgical Transactions*, and since that period it has often occurred to me, that the principle of producing a state of syncope before an operation, in order to save pain, might be occasionally adopted with great advantage. There are a number of facts which could be brought forward in order to establish the propriety of such practice. In the majority of the more severe operations, patients are seldom removed to their beds without being brought, from the quantity of blood removed, and the mental agitation, to a state approaching to syncope; and if this state does not militate against the recovery of patients from such operations, might it not be a rational practice to produce this state previous to the operation, and thus save the pain of it?

I shall have occasion by-and-by to point out the general fact, that the number of recoveries from operations is usually in proportion to the quantity of blood lost during their performance. I mean to be understood, that in all operations where the patient has lost a considerable quantity of blood, there is generally the least subsequent inflammation of the wound, and fever, the only class of symptoms which usually retard the progress of recovering from operations. The removal, therefore, of blood before an operation in such a quantity as shall produce syncope, would appear to be rather a beneficial than an injurious measure, as far as regards the subsequent healing of the wound. In the reduction of dislocations and of herniæ, it is a common rule of surgery to produce syncope before an attempt is made at reduction, either of the misplaced bone or of the prolapsed intestine; and why should not the same practice be adopted in order to save the pain of an operation? So much am I convinced of the propriety of such a practice, that I shall embrace the earliest favourable opportunity of putting it into execution, and whenever I meet with a patient requiring an operation, who has a great dread of pain, I shall certainly produce in him a state of syncope, and in that state perform the operation. Future experience can alone point out the circumstances under which such a measure can with safety and propriety be adopted.

I am not aware that there is any certain mode of producing syncope so effectually and so safely as by the abstraction of a quantity of blood from the arm, though from some ingenious observations of Dr. Arnott in his excellent work entitled *Elements of Physics*, he proposes a new mode of producing fainting without having recourse to bleeding. This proposal is, to inclose one or both limbs in a bag or box, from which the air is to be exhausted by an air-pump, and thus, the pressure of the atmosphere being removed from the vessels of the limb so inclosed, such an increased flow of blood would take place into the limb as would produce a state of fainting, by occasioning a corresponding diminution in the quantity of blood in the brain.

I might also notice, that when an operation is performed on a person in a state of syncope, the operator will derive great facility in performing it, from the circumstance that he is not perplexed with hemorrhage; and I remember when performing the operation on the person's head just alluded to, that the dissection appeared just as if it had been made on a body recently dead.

I have met with several individuals who could not make up their minds to submit to operations, from the dread of bodily pain.

Case.—A general officer, who had an encysted tumour under the angle of the jaw, which, from the opinions he had received, he was extremely desirous to have extirpated. Repeated but fruitless attempts were made to perform the operation with the usual assistants, for whenever it was about to be commenced, he violently wrested himself from their hands. At last he made up his mind to allow himself to be bound down with ropes. This being done, and even after he had been completely fastened, and the operation was about to be commenced, he endeavoured to free himself. The means of security were, however, such as to enable the operator safely to begin the incision through the skin, and as soon as the patient was aware that resistance was unavailing, he became perfectly tranquil, and allowed the operation to proceed, and it was finished in the most satisfactory manner.

In the next lecture, I shall consider the treatment which it is necessary to pursue after an operation has been performed.

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LECTURES ON SURGERY,

DELIVERED BY

MR. WARDROP.

ON SURGICAL OPERATIONS.

Utility of Syncope during and after Operations—Accession of Inflammatory Symptoms—Importance of Bleeding from the Wound—Venesection, Calomel, Opium, Antimony, and Colchicum—Secondary Hemorrhage—Treatment of the Wound—Diet—Pernicious Effect of improper Food.

Having in the two last lectures endeavoured to point out the various circumstances which require attention previous to performing surgical operations, more particularly certain varieties of constitutions, differences of temperament, of age, of season, and states of the atmosphere; and having also endeavoured to point out the treatment necessary previous to the performance of operations, as well as the modes of conducting them, I have to consider the system of treatment which ought to be employed *after* operations have been effected.

Effects of Syncope.—After an operation it is of great consequence to place the patient under circumstances where he may enjoy the most perfect tranquillity and uninterrupted sleep. It is a common practice to give wine and such-like cordials, with a view to relieve the state of syncope or depression which usually occurs during the performance of, or which follows, operations; but I would recommend you not to have recourse to those measures, and rather to consider such state of collapse favourable to the future recovery of the patient, as nothing will contribute more towards preventing the accession of any febrile symptoms. Of late years, particularly, I have strictly followed this practice,—a practice, it must be admitted, very opposite to that usually pursued; for, generally, when a patient becomes faint during an operation, not only is wine given, but the surgeon does not even proceed with the operation until the patient recovers from the syncope, or when syncope comes on after the operation, then it is the custom freely to give wine until the vital powers are restored. Instead of following these rules, you ought to take advantage of the *insensibility* of the patient in a state of syncope, and of the parts not being gorged with blood, to hasten with the operation, and, as has already been said, instead of using artificial means to restore the heart's action when syncope succeeds an operation, the longer that state is protracted the greater will be the check given to the occurrence of subsequent inflammation.

Inflammatory Symptoms.—There are different classes of symptoms which may come on after an operation, and which, if not subdued, may either protract the cure, cause the complete failure of the operation, or even destroy life itself. An inflamed state of the wound, accompanied by fever, is by far the most usual and the most dangerous state which can follow an operation; for which reason I shall first direct your attention to this subject.

It will be generally found, that within the first twenty-four hours, and often in even a shorter time, a very correct estimate may be formed of the probable degree of violence of the febrile attack which is likely to come on after an operation. It has been observed by Dupuytren, the most celebrated surgeon of our time, that of all those who died at the Hôtel Dieu after operations, the majority perished in consequence of inflammation of an internal organ; sometimes two, three, or even four organs, having been thus affected in the same individual.

Bleeding from the Wound.—Nothing will tend so much to diminish this inflammatory disposition as attention to those precautions which have already been pointed out as requisite in the *previous treatment* of the patient; and it will be seldom found in those cases in which the wound made during the operation has bled freely, that there is much subsequent inflammation. Hence, it may be observed as a general maxim, that those who lose most blood during operations, have the least subsequent fever, and with them the wounds heal most speedily.

It is indeed extraordinary the quantity of blood which a person in health may lose with impunity at one time; hence, after the syncope which follows an operation has passed away, the patient who has lost an immense quantity of blood often seems not to suffer from it in any way. This observation is strikingly exemplified in the field of battle; and it was remarked of the wounded soldiers at the conflict at Waterloo, that many who had been left on the field until the third and even fourth day after that memorable battle, from being supposed to be either dead or in a hopeless condition, recovered much more rapidly than those who were first received into the hospitals. This could only have arisen from the great loss of blood, and the want of food to which they were exposed for so long a period after they were wounded, which, if it did not prevent the accession of inflammation, at least rendered it mild and harmless.

Case.—On operating on a fat and gouty patient for the *stone*, after the urine had gushed from the wound, and the stone was removed, a profuse stream of dark venous blood continued to flow from the wound, and the stream was so large, continued so long, and was followed with such a degree of syncope, that I became alarmed. As, however, there appeared to me no local means to be employed to stop a bleeding from numerous large veins so likely as the syncope produced by the loss of blood, I used no means to restore the heart's action. At last the hemorrhage gradually decreased, but the patient remained in a faint state for many hours, and for several days in extreme debility, no cordials being administered; but the wound healed with rapidity, and the ultimate recovery of this patient was unusually rapid.

Case.—Some time ago I assisted Mr. Lawrence in removing an enormous tumour attached to the nates of a female. From the extensive surface of the wound, and the profuse bleeding from the divided vessels, this patient lost an immense quantity of blood, and she was taken to bed in a state of extreme exhaustion. The edges of the wound were stitched together, but no dressing was applied, and it was thought prudent to leave her quiet, and give her nothing but a large dose of opium. She remained in a very debilitated state, and it was not until the following day that she was able even to have her clothes changed. The effect of this excessive depletion was, that the whole of the enormous wound healed by adhesion, and she was well enough to leave London on the fifteenth day after the operation.

Case.—I removed one-half of the lower jaw from a young woman of a delicate frame, and it was estimated that she lost not less than *three pounds* of blood during the operation. The effect of this great depletion was, that scarcely any feverish symptoms supervened, and almost the whole wound healed by adhesion, the girl leaving the hospital on the thirteenth day after the operation.

Case.—A gentleman received a compound dislocation of the ancle joint, in order to reduce which, the surgeon thought it necessary to produce a state of fainting, and accordingly bled him at the arm. The operator removed not less than three and a half pounds of blood, the effect of which was not only to enable the dislocation to be reduced with facility, but the loss of so much blood completely prevented any subsequent inflammation of the wound or severely injured parts.

There is a circumstance regarding the

operation for *cataract*, which may be noticed here, as it illustrates the foregoing remarks. In extracting a cataract, it is well known that there is never any loss of blood from the wound, which circumstance is probably the cause of there being always more or less subsequent inflammation, and therefore that operation is seldom performed, without its being necessary to remove some blood from the patient afterwards.

If, therefore, so much benefit is derived from a comparatively large quantity of blood being lost during operations, and if, also, the state of syncope or collapse equally contributes to prevent the accession of inflammatory symptoms, both the bleeding from the wound, and the occurrence of syncope, ought certainly to be regarded as auxiliaries to success. The syncope which takes place both during and after operations, has never, as far as I know of, been attended in any instance with bad effect, and therefore a patient ought not, by the admission of fresh air, or the exhibition of cordials, to be too hastily roused out of that state. Neither ought the bleeding from the wound to be stopped, until a considerable quantity of blood has been abstracted, except only when vessels of considerable magnitude have been divided, or the patient, previous to the operation, has been in a state which makes it of importance that much blood should not be lost.

Besides the advantages to be derived from allowing the wound to bleed freely, in preventing the accession of inflammatory symptoms, the circumstance of not considering it necessary to place ligatures on every vessel the moment it is divided during an operation, enables it to be performed much more quickly; and I have often been surprised, after a tumour has been removed, such as a scirrhous mamma, to find so few arteries requiring ligatures, when during the operation the hemorrhage was very profuse. This arises both from the circumstance of branches from the same trunk being divided repeatedly during the operation, and from the natural efforts to stop bleeding being sufficient to arrest the flow of blood through vessels even of considerable magnitude.

The effects to be anticipated from thus at once checking all inflammatory action, is not only to prevent the accession of inflammation of any vital organ, but to secure the process of adhesion, or to get the wound to heal, as it is usually called, by the "first intention," when that is desirable.

It is well known, that the less the inflammation which attacks a wound is, the more certain are the edges of that wound to adhere by the "first intention." On the other hand, when inflammation even to a trifling extent attacks a wound, such as that made in the operation for hare-lip, or for the excision of a cancerous lip, union is thereby greatly prevented, and ulceration takes place. Hence it was, that in the cases just mentioned, the absence of inflammation favoured the immediate adhesion and ultimate union of the divided integuments.

It has already been observed, that operations on children and on the aged are more successful than when performed on persons in the bloom of life. This remark applies to those operations, in which, to render them successful, it is essential that the wound should adhere by the first intention, and hence it will usually be observed, that wounds made in children and aged people, are followed by much less inflammation than on persons at any other period of life.

Often, however, it happens, that a patient may have lost a considerable quantity of blood during an operation, and have undergone a rigorous previous treatment, and still inflammatory symptoms do supervene, which can only be relieved by an active system of treatment. This treatment consists chiefly in bleeding, purging, and the exhibition of the *tartrate* of *antimony* or *mercury*.

Venesection.—In the adoption of venesection, you are to be guided by the local pain, and by the state of the pulse and skin. There is often a local pain after an operation, which is not of an inflammatory type, and which may be relieved by a full dose of opium, but whenever, along with the pain, the pulse becomes strong and full, then venesection ought to be employed.

While endeavouring to point out the general rules for abstracting blood, I shall particularly dwell on the symptoms which ought to guide you in estimating the quantity to be removed. Suffice it now to observe, that when it is necessary to have recourse to bleeding after an operation, the first bleeding ought invariably to be carried to the full extent, by which, let it be understood, that the blood should be allowed to flow, not only until the pulse is reduced, but until it is imperceptible at the wrist, or until syncope takes place.

Bleedings are more apt to be made too small than too large, but by adopting the general rule of bleeding largely at first, you will often prevent the necessity of repeated small bleedings; when, however, the *first* bleeding has not been sufficient completely to check the progress of the inflammatory symptoms, an early repetition of it becomes particularly necessary, and by thus at once arresting the progress of the disease, the abstraction of a much less quantity of blood is sufficient, than would be required if the inflammatory affection were allowed to advance.

Purgatives.—It has already been observed, how necessary it is completely to evacuate the alimentary canal before the performance of an operation. It becomes equally requisite to pay strict attention to the evacuation of the bowels after an operation has been performed, and during the whole progress of the cure. Whenever there is any accession, or any increase, of febrile symptoms after an operation, always examine into the state of the *primæ viæ*, where, generally, the cause of the disturbance will be found. It often happens, that without any febrile symptoms the wound becomes painful, and whenever the bowels are freely evacuated the pain is removed; but where febrile symptoms have supervened, and it has been necessary to employ venesection, it is then advisable not to be satisfied with merely evacuating the bowels, but they ought also to be more or less purged.

Besides bleeding and purging, there are other means which may be had recourse to for the alleviation of certain inflammatory and febrile states produced by surgical operations.

Calomel and Opium.—In some cases, notwithstanding the free use of the *lancet*, the wounded parts remain unnaturally red and painful, and the pulse indicates the impropriety of abstracting more blood. Under such circumstances, much benefit will arise from the internal use of calomel and opium—the tartrate of antimony, or colchicum. These three different remedies have each their particular effects, and there are states of disease where the one may be used more advantageously than the other. A couple of grains of *calomel*, with one of *opium*, may be given every two, three, four, or six hours, according to the severity of the febrile symptoms, and the effect of the remedy; or the *tartrate of antimony* may be administered in such doses, and at such intervals, as shall keep up nausea, and thus diminish the heart's action. The *Colchicum* is also a useful remedy in some cases, and more particularly in those where there is a gouty disposition. From ten to twenty drops of the *wine of colchicum* combined with *magnesian salts*, may be given at intervals of four, six, eight, or twelve hours, according to the violence of the symptoms.

The *warm-bath* is also a useful agent, and there is scarcely any circumstance under which it may not be advantageously employed, evacuations having been previously obtained to the necessary extent. So also counter irritants, blisters applied at a distance from the inflamed part, or sinapisms to the feet, have often the effect of alleviating that peculiar state which bleeding cannot relieve.

Secondary Hemorrhage.

Next to inflammation and fever, hemorrhage after amputation must be considered the most serious consequence of surgical operations, and it has often been the cause of their fatality. Before dressing the wound after an operation, care is usually bestowed to observe and place ligatures on all the arteries which pour out blood in a considerable stream. Any subsequent bleeding of the wound is, therefore, to be looked for in the smaller vessels. Now I am convinced that bleeding from these vessels to any inordinate quantity, will rarely ever take place, provided the wound is not improperly dressed. If the wound be left exposed to the open air, and with no other covering than clotted blood, all bleeding to any undue extent, and that even from arteries of considerable size, will cease in a few hours, and if hemorrhage recurs at any future period, it will always be observed to be preceded by a more or less inflammatory action in the wound, or by a febrile state of the system, accompanied by what is called a hemorrhagic pulse. Under such circumstances, the bleeding ought rather to be encouraged than checked; for it will be invariably found, that the loss of blood is the means of completely subduing all inflammatory and febrile action. Surgeons are, in general, much too anxious to arrest hemorrhage, from the alarm which the appearance of blood usually creates, as well as from a common notion of the importance of saving blood.

Spontaneous hemorrhages, as shall afterwards be pointed out, are always to be considered as efforts of nature to relieve either the system, or a particular organ, of a certain quantity of blood; and in many cases where hemorrhage takes place from wounds, such bleeding ought also to be considered as an effort made by nature to subdue an inflammatory disposition in the wounded part.

Case.—A man now in the Hospital of Surgery, and whose carotid artery was tied some time ago, had frequent secondary hemorrhages from the wound, which to some appeared alarming, but I was convinced that the blood did not flow from the carotid artery itself, but it was poured out from vessels which had been divided in making the incisions, and that the bleeding was an effort of nature to relieve an inflammatory disposition in the wound, I therefore abstracted a considerble quantity of blood from the arm, instead of using any local treatment.

Though by no means of common occurrence, yet hemorrhage is sometimes caused by a want of coagulating power in the blood. In order to stop the flow of the sanguineous fluid from the mouth of a divided artery, it will be afterwards explained, that one of the chief means which nature employs in effecting this object, is to form a coagulum of blood in the cellular sheath, and in the extremity of the canal of the vessel. Now I have met with cases, and similar cases are to be found on record, where the chemical nature of the blood was so altered, that it did not possess this power of coagulation; and hence, if a person whose blood is in this state receives a wound, the bleeding orifices of the vessels cannot be plugged up with a clot in the usual manner. When treating of the diseases of the blood, I shall mention the particulars of such cases, but they occur so rarely, as not to require here a more detailed notice.

Treatment of the Wound.

For some years past I have been in the habit of using as little dressing as possible to all recent wounds, fully convinced that the attempts usually made to draw forcibly and keep together the edges of the wounds by the application of plasters, ligatures, and bandages, are the chief causes of consecutive inflammation. In treating, therefore, a wound made by the operating knife, I always make a distinction between those cases in which it is desirable and practicable to procure adhesion, and those in which the wound is to be healed by the process of granulation and cicatrization. In the first class of cases, the lips of the wound, though readily brought in contact, must be kept together by artificial means, such as stitches, pins, adhesive plasters, and bandages. But when it is known that the lips of a wound cannot adhere together, then instead of endeavouring to effect union by adhesion, and forcibly bringing the edges of the wound together, the cavity of the wound should be filled up, and covered with nothing but clotted blood. The effect of this practice generally is, that no inflammation, or even redness, comes over the adjacent integuments, and the wound gives no pain. After the lapse of a few days, the coagulum of blood, which thus forms a most mild covering to the newly-divided parts, is separated, the process of granulation and suppuration having commenced underneath. It is in this state that artificial means may sometimes be employed to assist nature in bringing the sides of the wound together, for adhesive plasters may be now used to aid this process, without risk either of irritating the granulating surface, or of creating inflammation in the edges of the wound. I have been led to this mode of treating wounds, step by step, first adopting it only in small incisions, but finding it so beneficial as now to employ it in all cases even of the largest wounds.

Case.—The *mamma* of an aged female had attained so enormous a bulk as to render her life most uncomfortable. The weight made it agonising when she was either sitting up, or lying upon her side, and it was so great as to prevent her breathing when she attempted to lie on her back. No contaminated glands could be detected, and except this tumour she had no apparent disease. Though well aware of the uncertainty of the ultimate result of an operation, yet I was induced to perform it by the urgent entreaties of the patient, and by the hope that being relieved from the burdensome torture of such a formidable mass of disease, her future sufferings would be greatly mitigated. In performing the operation, every possible endeavour was made to dissect the tumour away as quickly as possible; and although the bleeding was exceedingly profuse during the operation, the fingers of the assistants being ready instantly to press on every divided vessel until the whole mass was dissected away, only four vessels were afterwards deemed necessary to be secured with ligatures. The largest wounded surface I ever beheld was now exposed, and no dressing of any kind applied to it but a few pieces of lint on the surface, in order to absorb the more blood, and form a more complete covering to the wound.

The result of the operation, and the mode of treating the wound, were equally satisfactory. With the assistance of opiates she remained free from pain, and the absence of the enormous swelling enabled her to sleep with a comfort long unknown to her. The striking feature in the history of this wound was, that the large thick clot formed by lint and coagulated blood remained for upwards of thirty days, the process of granulation, approximation of the edges, and cicatrization of the wound, going on underneath this cake, so that when it separated, but a very small surface remained open. Hence, by the simple treatment, of merely covering a large wounded surface with a coagulum of blood, this patient was saved all the daily suffering of the usual plasters and bandages applied, and all the irritation and inflammation of the adjacent integuments, which such dressings never fail to create.

Diet.—The next subject to which your consideration is to be directed in the management of patients *after* operations, is that of food, and this merits more attention than it usually receives; nothing in short but experience and observation will convince you of the extraordinary influence which improper food has on those who have been the subjects of surgical operations; an influence which is exercised not on the wounded part alone, but throughout the whole system.

From what has already been remarked regarding the benefit to be derived from syncope, and from the state of exhaustion which often succeeds operations, by preventing inflammation of the wound and febrile excitement throughout the system, you can readily believe how essential it will also be to guard against the occurrence of the same class of symptoms from the want of strict attention to diet. I have already mentioned that after the battle of Waterloo, the wounded men who were not removed from the field into the hospital for a considerable number of days, and many of whom had neither tasted food nor drink, recovered of their wounds much sooner than those who had received the earliest attention. This fact, with many others, shows in the most indisputable manner, how little food is necessary for patients under such circumstances, and ought to teach us how cautiously it should always be administered.

As a general rule, patients under treatment for an operation, ought never to be allowed to taste any but vegetable food, and that in a liquid form, as long as there are any febrile symptoms. Gruel, tea, fruit, and various acid drinks, ought to be their only sustenance; and you will constantly observe, that the more simple in quality and the less in quantity is the food of patients who may have undergone important operations, the less fever will supervene, and the more quickly will the wounds heal. When all danger of the immediate effects of the operation are over, as regards inflammation, then may the patient be allowed a small quantity of chicken or veal-broth, or of beef-tea. But it is proper to commence sparingly, and watch their effects; for if they produce any heat of skin or restlessness, and symptoms of indigestion, they should then be discontinued.

I have generally noticed, that as long as a patient is confined to bed, so long is it hurtful to give him animal food, particularly in a solid form; but when he is so far recovered as to be sitting up, and removed into another apartment, he may then begin its use cautiously. I say cautiously, because, from the stomach having been a longer or shorter time unaccustomed to digest solid animal food, when it again receives it the digestive powers will be found very feeble; and if more is taken than can be properly digested, the train of symptoms which sometimes ensue is incredibly severe. I have seen great advantage derived from giving the patient, when he commences taking animal food, a common *aloetic pill*, and one of the *compound rhubarb pills*, immediately before his meal, by which the digestive process appears to be much assisted, and the bowels afterwards well regulated. Patients should not eat solid animal food more than once a day under almost any circumstances.

It is seldom necessary to give cordials during the progress of the cure of a wound, and I always follow the rule of not giving them until the lapse of several days. If they are given a day too soon, they may do much mischief, whereas the delay of a few days can be of comparatively little consequence. By cordials, I allude chiefly to wine and malt liquors. When the pulse is very low and feeble—the granulations of the wound pale—the discharge profuse—the patient's strength much exhausted, then wine and malt liquors may be prescribed, but they should always be used with great caution, and whenever they make the patient feel heated and restless they should then be discontinued. As a general rule I would therefore remark, that those patients who are most reduced before operations, who lose most blood during them, and who get the least food after them, recover far more speedily than those who have been treated on the opposite system.

Pernicious Effects of improper Food.—I have already alluded to the severe and even dangerous effects which sometimes result from partaking too soon of solid animal food after operations. I could bring a variety of facts under your view to establish this most important practical observation, and the pernicious effect of animal food is illustrated not only in those who partake of it too soon after surgical operations, but abundant proofs may be daily observed where women after childbirth, and patients after an attack of fever, suffer, in a most severe manner, from a like imprudence in diet.

Dr. Baillie, in his posthumous observations, briefly notices the same circumstance in regard to fever. "I have never observed," says he, "a person having a relapse of *fever* where it has not been caused by eating animal food." You will almost always find that the female after delivery never suffers from fever until she has eaten animal food. Sir Richard Croft first made this circumstance known to me, and I have often had opportunities of seeing his statement confirmed. So much am I now convinced of the powerful effect of animal food on all convalescents from diseases of an inflammatory type, that I will venture to assert, whenever you observe a patient who is progressively recovering from such disease become suddenly feverish, you will invariably find, that he has been imprudent in his food. It is extraordinary how prone even the most enlightened persons are to the gratification of the palate; and I have no hesitation in declaring, that the management and *enforcement* of obedience in diet, is the most irksome and difficult duty a medical man has to perform. Amongst the lower orders of the community, such as those generally admitted into public hospitals, the management of their food is a theme of constant warfare. Such people are apt to conceive, that the officers of charities do not give them the necessary diet, or the food they may desire, from mere motives of economy. The necessity of, in many instances, acquiescing in their importunities is often the source of mischief; and I have no doubt but the system of gratification, which it is so little in the power of medical officers to control, materially checks the progress of improvement often witnessed in the convalescents in our hospitals.

Case.—The pernicious effect of the too early use of animal food was exemplified in an extraordinary degree in a patient after the operation for *hernia.* A gentleman in the vigour of health had a strangulated inguinal hernia, to reduce which he had been profusely bled, and had other means employed, without effect. I saw him but a few hours after the strangulation had taken place, and from the excessive tenderness of the tumour, feeble state of his pulse, and other circumstances, I determined on performing the operation immediately, which was accordingly done. From the period of the operation, his recovery went on progressively, and the wound was healing with great rapidity, when on the eleventh day, feeling in every respect convalescent, and having a great desire to eat animal food, he partook of a small piece of beef-steak. The consequence of this was, that febrile symptoms soon supervened, and a surgeon being sent for during the night, he found him complaining of great pain in the wound, extending into the abdomen, which induced him to bleed the patient freely. It is needless to detail the particular symptoms which succeeded this attack; I shall only state, that this patient required not less than six weeks' active medical treatment before he was restored to the state of health which he enjoyed before he partook of the animal food.

Case.—The case of a medical practitioner which excited great interest at the time, also illustrates the pernicious effects of eating animal food too soon after an inflammatory attack.

This person in dissecting the body of a female who had died of puerperal peritonitis, pricked his finger, the consequence of which was that the wound inflamed, and the inflammation extended in a violent degree along the lymphatics of the arm. These symptoms were completely subdued by venesection, and the application of a great number of leeches.

When he was in a state of convalescence, he accidentally smelled some cooked animal food, and insisted on having a portion of it. He ate but a small quantity of broiled mutton, soon after which he became exceedingly uneasy, and passed a very restless night. On the following day erysipelas appeared upon the arm, and so severe was the attack, that though depletion was carried as far as possible, from the very first appearance of the symptoms his life was conceived to be in imminent danger, and it was many weeks before he perfectly recovered.

Case.—A person advanced in life, corpulent, and of a gouty diathesis, had a *Cataract* removed from one eye, after having undergone a careful preparation for several weeks. The subsequent inflammation was slight, and the wound adhered. In eight days I extracted the lens of the second eye at the particular request of the patient. Little inflammation followed; and whilst there was every reason to entertain the most sanguine hope of the complete restoration of his vision, this patient, a few days after the second operation, took a large basin of strong broth, and became in a few hours feverish; pain attacked both eyes, and so violent was the subsequent inflammation, that the most copious bleedings, purging, mercury, &c., did not arrest its progress. In a few days it assumed a gouty character, over which the colchicum had no control, and it never abated until the wounds of both corneæ ulcerated, and the contents of both the globes were discharged.

Case.—A youth accidentally received some shot on the back of the head from a fowling-piece. When he was in a state of convalescence, he was induced to eat a small portion of animal food, and to drink a glass of wine. During the night he became feverish, symptoms of inflammation of the brain rapidly succeeded, and on the fourth day he expired.

Case.—I have mentioned to you the case of a lady from whom Mr. Lawrence had removed a large tumour of the hip, and that in this case the wound healed with unusual rapidity; which was to be attributed to the circumstance of her losing a large quantity of blood at the time of the operation. Now although this immense wound healed, and the patient left London on the fifteenth day after the operation, yet a circumstance occurred regarding food, which retarded her recovery, and which also illustrates the doctrine I am now endeavouring to inculcate. This lady, eight or ten days after the operation, feeling herself exceedingly feeble and low, and having till then tasted nothing but water gruel, was induced to take a basin of beef-tea. In a short time she became heated and restless, and her pulse quick; this was in the evening attended with so violent a headach, that besides giving her a powerful cathartic, eighteen leeches were applied to her head, by which prompt and active measure she was soon relieved.

Some time ago, when visiting the Fever Hospital, one of the best-regulated institutions in this metropolis, I was amazed in looking over the list of weekly expenses, to find often the item of "beef-steaks." Having expressed my surprise that the fever patients should get beef-steaks, I was informed, that the medical officers were under the necessity of giving the convalescent patients some animal food, having learnt from experience, that if they were sent home with an unsatiated and voracious appetite, they were apt to indulge in an enormous meal, which in several instances had proved fatal.

The treatment which ought to be employed when patients have taken improper food after an operation, should consist of the early exhibition of emetics or purgatives; and should febrile symptoms supervene, recourse must be had to venesection and febrifuge remedies.

Stimulating drinks are equally as pernicious to the healing of wounds, as improprieties in food.

Case.—A gentleman on whom I operated a few days ago for an extensive fistula, was induced to drink a small quantity of porter; the consequence was, that he complained of pain in the wound during the whole night, and was extremely restless until his bowels were completely evacuated.

In immediate connexion with the subjects already considered in this lecture, I have yet to direct your attention to several circumstances of great interest and importance, but the exhaustion of our allotted time indicates that I must now discontinue my address.

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LECTURES ON SURGERY,

DELIVERED BY

MR. WARDROP.

ON SURGICAL OPERATIONS.

Tranquillity after Operations — Salutary Moral Excitement—Exhibition of Medicines — Consecutive Treatment of the Wound in different Temperaments and Constitutions—Principles of the Treatment of Wounds and Injuries—Conclusion.

In the concluding part of the last discourse I was occupied in pointing out the great nicety required in the regulation of the regimen of patients who had undergone surgical operations; and I related several cases, and quoted the observations of some distinguished men, in order to impress on your mind the pernicious effects of improper food, not only after operations, but in convalescents from all diseases of an acute or febrile character. I also endeavoured to prove the importance of not giving wine or any cordials during the state of collapse, which is brought on from the loss of blood during an operation, in order that the sufferer might derive the benefit from such depletion, by not only preventing future inflammation of the wound, but from the fear that the re-action produced by the use of stimuli at such a time could not fail to increase the disposition to consecutive inflammation. I have experienced such essential benefit from this rule of practice, that in the Hospital of Surgery, where numerous operations of all descriptions, and on individuals of all classes, and under all circumstances, have been performed, there is no wine ever used, and none even provided in that establishment; and it is a general rule never to give cordials or stimuli but in a medicinal form, which ensures their never being taken in an improper quantity, or at an improper time. The only instance I recollect of having given wine to a patient during an operation, for several years past, was in the case of a youth, who, though very desirous of having his limb amputated from the torture he had endured by the disease, when the moment arrived, and every preparation for the operation was made, lost courage. Having been extremely reduced in strength and flesh, I ventured, as the only means that occurred to me, to give him wine. Such was its exhilarating effects, that he almost immediately submitted to the operation, and bore it with fortitude. Having drunk a whole bottle of a light French wine, he was in a state of intoxication for some hours afterwards, during which time it was necessary carefully to watch the stump, as it was difficult to keep him quiet; but the result was most favourable, for he fell soundly asleep, and never had any subsequent febrile symptom. Most part of the wound united.

Bodily and Mental Tranquillity after Operations.

Patients cannot be kept too quiet after operations, or, at least, until there is no longer a risk of febrile excitement. But even when the danger of fever has passed, the tranquillity of the body essentially contributes to the healing of the wound. If you are in the habit of daily visiting a person who has a granulating wound, you will be struck with some change in its appearance whenever the patient has taken any bodily exercise. He ought, therefore, always to be warned, that however certain his ultimate recovery may be, still the complete repose of the body will limit the period of his confinement. It is the same with regard to the effects of mental excitement, and, therefore, the mind ought to be kept as tranquil as the body. When a person has undergone a severe operation, even the slightest attempt to employ the mind, for purposes which on other occasions would give it no fatigue, will now create great excitement, and this will always be characterized by a corresponding change in the state of the wound. Particular attention ought to be paid to this part of the after-treatment, and to impress on those around the patient the necessity of keeping him perfectly tranquil, and not indulging in conversation, more paticularly on subjects which are at all likely to agitate his mind. The circumstance related by travellers of some savage tribes secluding their wounded warriors after a battle until they have recovered, even from the sight of a female, is a proof of the importance they attribute to allaying every kind of excitement under such circumstances. When a patient's mind has been much excited, it will generally be found, that besides the influence of such excitement on the wound, the digestive organs have become more or less deranged, and particularly the biliary secretions. In such cases, a large dose of calomel, not less than five grains, uncombined with any other medicine, often produces the most beneficial effects.

Effect of Salutary Moral Excitement.

This abstraction from all mental excitement, must, however, be extended only to a certain period of convalescence. A time will arrive when the patient, who could not endure without suffering the most trifling subject of conversation, begins to take an interest in objects that are around him, and seeks for the society of those who are most congenial to his feelings, and if care be taken to limit this excitement, it will rather assist than protract his recovery. It is the complete seclusion from all moral excitement that constitutes the punishment of the criminal who is condemned to solitary confinement.

The powerful and reciprocal influence of the mind on the body should never escape consideration in the treament of diseases. You cannot prescribe successfully for the one without deliberating on the circumstances connected with the other. A certain quantity of excitement would, indeed, seem essential to the vigour and activity of the physical frame, and nothing contributes more effectually to the full development of the moral and physical constitution of man than this salutary degree of mental excitement, beginning even from childhood. Young people do not acquire either a high degree of muscular power or of mental energy who are reared and educated in too mechanical or systematic a manner. Hence arises the striking difference which is observable in the youth who has been brought up in the country, and little hampered by scholastic discipline, and he who has had a rigid systematic education, and has been subjected to the confined habits of a large city. You may observe the same influence of moral excitement on the physical frame, by comparing the children of the affluent with the offspring of those who move in the more humble walks of life,—the former having grown up beneath the rigid control of a nurse whose competency and faithful services are measured by the methodical and monotonous habits of those who are placed under her care, whilst the children of persons whose circumstances do not admit of such watchfulness and method, mix in the hourly occupations, and receive all the tender care of the parent,—become interested and excited and recreated by all that passes around them. Hence the body acquires that degree of vigour and strength which is chiefly to be found in that order of the community to which they belong. The children who attend "charity schools" illustrate these remarks very strikingly, and an intelligent military officer, whose duty it is to examine into the physical nature of youths in selecting them for the service of the army, once observed to me, that those who were brought up at the "Military Asylum," were of a much more slender frame than such as were selected from mixed society, and this he attributed to the monotonous regularity of their habits at that great national institution, and their non-exposure to a sufficient round of exciting circumstances.

In the rearing of the young, therefore, it becomes as important a matter of discussion, as it does in the management of the sick, to draw the line of demarcation which should mark the length we ought to go, in order so to practise and train the intellectual powers as not to enfeeble the bodily frame, and how far we can employ the physical powers, so as not to deprive the mind of its appropriate vigour, or arrest its due cultivation. This influence of mental excitement is exemplified in convalescents of all ages, and in every situation and condition in life, though it is, perhaps, more striking in soldiers and sailors, from the intensity of the passions to which they are exposed, and the high gratification they derive from the success of their exploits. There are many very remarkable examples in military history of soldiers who, while in a state of great exhaustion from disease, have been suddenly called on to execute some arduous and severe duty, in performing which, their debilitated frames, instead of suffering from the task, have recruited their strength, and that, too, apparently in proportion to the difficulty, fatigue, and danger of the enterprize. It is a remarkable fact, that when a victorious army is advancing through an unhealthy country, and often undergoing the severe privations which are inseparable from their situation, the sufferings which they undergo are small when compared with those which the soldiers of the retreating army endure. And so it is with sick sailors, who have been often known to make the most extraordinary exertions, without injury to their health, when called from the bed of illness, either to join in battle, or assist in saving the vessel from being wrecked. A lieutenant of the navy had from hard drinking rendered himself unfit for his ordinary duties, and was confined to his bed: his ship was placed in imminent danger during a storm: he arose from his couch, and made the most active exertions, during which, both his body and mind recovered their wonted vigour, but when the danger was over, he returned to his bed and immediately relapsed into his former state of insensibility! It is even so with domestic animals,—the sheep who has the greatest range of pasture is the most healthy, and the horse who has to perform the greatest variety of labour and exertions consistent with his powers, is always in the highest condition.

It is from this principle of moral influence, too, that invalids chiefly derive such extraordinary benefit from "changing the air," as it is usually expressed, and hence you should attentively watch for the period of convalescence which is marked by the patient's own desire to effect that object, when it will be highly beneficial for his recovery after an operation, not only to be removed into another apartment, but to some new situation or place, more particularly where he may enjoy the cheerful and salutary air of the country.

Exhibition of Medicines.

Medicines are not, however, to be entirely disregarded in calming the mind, and producing that soothing moral influence which is so desirable after an operation. Of this class of remedies is camphor, galbanum, opium, hyoscyamus, and other narcotics.

The acute pain of an operation, it has already been observed, is to be relieved with *opium*, and that, too, in full doses. Besides giving a large dose of *laudanum* before an operation, and after it a couple of grains of *crude opium* combined with *calomel*, for the reasons formerly mentioned, a pill consisting of one grain of *opium* may be taken every hour subsequently, until the pain is relieved and the patient falls asleep. After the more severe operations, a full dose of *opium* ought to be continued every night as long as its effects are beneficial. It is a mistaken notion, that the free exhibition of opium under such circumstances is hurtful to the system. On the contrary, by alleviating pain, you always mitigate or subdue disease, and thus allow the natural processes to be less interrupted, and the alvine evacuations, as well as the other functions, to be more regularly performed. Indeed, there are many persons on whom a small dose of opium has a most pernicious effect, causing sickness, vomiting, constipation, and a train of distressing symptoms, from its influence on the heart's action; whereas if the same person took a large dose, not less than what is equivalent to fifty or sixty drops of laudanum, no such disagreeable effects would be produced, but a most soothing influence pervade the whole nervous system.

There is an irritable state of mind which may be frequently observed after all the pain and febrile excitement, caused by an operation, have abated. Indulgence in improper food, or a loaded state of the large intestines, is each often accompanied by this state of mental irritability, and goes off on the restoration of the tone of the stomach, or after a plentiful alvine evacuation. This irritable state of the mind seems also to be sometimes the effect of mere debility, and as the body recruits, the nervous system also gains strength. Under such circumstances, more benefit will be derived from those medicines which soothe the brain and nerves, than a stimulating and too irritating regimen; for it must ever be kept in mind, that the digestive apparatus is as feeble in such cases as the muscular and other organs, and though, apparently, nothing but strength be requisite for the complete restoration of the patient's health, yet the feeble state of the digestive organs renders it imperative that more should not be required of them than they can perform well. In place, therefore, of allowing, under such circumstances, *more* food, a *lesser* quantity should be taken than can be comfortably digested when the body is in a state of health. Either the common *galbanum* pill, or a pill composed of one grain of *camphor* and two of the *ext. of hyoscyamus*, or a draught containing five drops of *laudanum*, and five grains of the *carbonate of ammonia* in *camphor* mixture, will often alleviate, in an extraordinary degree, a whole train of most distressing nervous symptoms. Any means which serve this purpose, materially tend to hasten the recovery of the patient from the shock and debilitating effects of the operation. Opium ought to be usually given either in very small or in very large doses. This state of mental irritability, or disquietude, may be subdued by the same treatment, from whatever disease it may have been caused; and I have often been surprised at the comfort which so small a dose of medicine has thus bestowed on those who have been suffering under a load of most distressing feelings. Anodynes taken in such small doses, and under such circumstances, seem sufficient to allay the morbid sensibility of the nervous system, while they are not so powerful as to affect the intellect. Hence, when, from any moral cause, the mind is unusually irritable, such medicines, while they subdue that state of irritability, do not prevent the mind being occupied by its most important duties. Frequently have I advised a nervous public speaker to take a small dose of laudanum before he commenced his speech; and I once heard a distinguished lawyer declare, that the best law papers he ever wrote, were composed at midnight with a bottle of wine by his side, drinking one glass after another, until the morning dawned, when he was ready to appear again at the bar. His theory was, "that the wine soothed his mind, and abstracted it from worldly cares and excitement, but was not taken in such a quantity as to destroy his logical powers."

The advantages of this temporary excitement of a certain quantity of spirits or wine, are sometimes experienced by soldiers and sailors in the hour of battle, and upon such occasions it has not an intoxicating effect, but when taken in moderation, merely tranquillizes the mind, without diminishing the vigour of the intellect.

It has already been mentioned, that operations sometimes prove fatal, either from the excessive dread which the patient has of the pain he is to endure, or from his fear of the danger of the operation. In such cases, in place of the inflammatory symptoms coming on after the operation, the pulse, which is depressed, never again acquires its usual strength, and the whole nervous system seems to receive a violent shock, from which it cannot recover. Examples of this are often observed after severe injuries and gun-shot wounds. Women sometimes die after parturition, under circumstances apparently similar. When a patient is in this state of collapse, in place of depletion, and the antiphlogistic regimen, it is usual to give cordials. Wine, camphor, ammonia, and opium, are generally employed under such circumstances, and given in doses and at intervals proportioned to the severity of the symptoms.

Consecutive Treatment of the Wound in different Temperaments and Constitutions.

When considering the effects of operations on persons of different temperaments, of different constitutions, and of different ages, some observations were made on the treatment necessary in each of these classes of individuals previous to the performance of an operation. After an operation has been performed on a patient of a *sanguineous* temperament, the symptoms are generally of an inflammatory nature or type, while those persons who are of a *nervous* temperament are more apt to suffer from the shock which the operation gives to the whole nervous system.

Peculiarities of constitution will always require much consideration in the treatment of patients after operations. Wounds heal very readily by adhesion in those who are of a *scrofulous* diathesis; but if the wound heal by granulation, and that process be extremely tedious, the sore sooner or later acquires a scrofulous character. In this state the general system of treatment becomes necessary, which will be pointed out when considering the subject of scrofula.

If, too, an operation be performed on a person labouring under the secondary symptoms of *syphilis*, the wound may heal by the first intention, but it will more probably granulate, and soon exhibit all the characters of a syphilitic ulcer, which ulcer must be treated like other secondary symptoms of syphilis.

When speaking of the *gouty* diathesis, and of the necessity of being aware of its existence previous to undertaking any surgical operation, several cases were mentioned to show, that when a patient of a gouty constitution receives an injury, its effects are generally, sooner or later, modified by that constitution. It was also stated, that there were cases where a person labouring under gout received an injury in some other part of his body, the gout was apt to attack the part thus injured; and hence I deduced the important practical lesson, of transferring the gout from the wound or a vital organ, to a less important part, by producing an artificial irritation in that new part.

The treatment to be employed in gouty constitutions, should any symptom of that disease appear after an operation, ought to consist in the employment of those means which are best calculated to remove gout under any other circumstances. The *colchicum* is here a most valuable remedy, combining it with the *carbonate* and *sulphates of magnesia*; or it may be taken in a common *saline draught*. Fifteen or twenty drops of the wine of *colchicum*, with a scruple of the *carbonate of magnesia*, and two drachms of the *sulphate of magnesia*, dissolved in *peppermint water*, or any of the bitter infusions, may be given once or twice a day, as symptoms indicate. Five grains of the powder of *colchicum seeds*, with *rhubarb*, is also a useful mode of exhibiting that remedy, and there is an extract of the *acetate* much in use, from which I have experienced the most decided benefit. One or two grains of this extract may either be taken singly or combined with the *extract of hyoscyamus*, or some other narcotic, once or twice daily.

Case.—I operated on a patient for a *Hydrocele*, who had repeatedly suffered from gout, and he deranged his stomach by a plentiful meal soon after the operation. In the evening of the same day, his whole scrotum became very much tumefied, and the skin of a bright rosy colour, accompanied by a white tongue, and a very feeble and frequent pulse. In place of bleeding him, I gave *colchicum*, under which treatment the arthritic inflammation which had attacked the scrotum was rapidly subdued, and gout affected the great-toe a few days afterwards.

When an operation has been performed, and the wound is attacked with arthritic inflammation, some further treatment, besides these internal remedies, becomes necessary. This chiefly consists in the application of stimulants to a part of the body situated at a distance from the wound, in order to translate gout to that part. In performing operations on the eye, more particularly for the extraction of cataract, a disease which frequently exists amongst gouty people, I am in the habit of applying with the greatest advantage a large blister upon one or both legs, or sinapisms to the feet, immediately after the operation, in order to create in the extremities a greater degree of irritation than the operation has produced in the eye. Thus, should any gout exist in the system, that disease will be more likely to affect the limbs than to attack the wounded eye.

Case.—A gentleman had long suffered from arthritic inflammation of his eye, accompanied by severe pain in the head. I recommended him to apply sinapisms to each foot, and being a man of great fortitude, he allowed them to remain on until so violent an inflammation ensued, that it terminated in ulceration of the skin; but the pain in his eyes and head was completely relieved. Some years afterwards, on inquiring if he had ever had any return of the inflammation in his eyes, he answered with a smile that the sinapism had completely and permanently relieved them!

Case.—I operated on a lady for *Cataract*, and the inflammation which succeeded the operation was speedily subdued by bleeding and evacuants. She had, however, frequently suffered from gout, and at the time this operation was performed, her sister was afflicted with an arthritic inflammation of one of the kidneys. A few days after the operation, a tract of severe easterly wind came on, and she was seized with an inflammation of her eye, of a decidedly gouty character, and which a repetition of the depletory treatment did not subdue. The *colchicum*, with a succession of *blisters*, applied behind the ears and upon the back, completely relieved the gouty inflammation; and I sometime afterwards learnt, that her general health was completely restored, and that she had a very perfect eye.

Besides the use of blisters on the legs, the feet may be bathed in warm water, to which mustard or vinegar has been added. A similar effect of local irritation as well as of depletion may sometimes be effected very beneficially by the application of a few leeches to the feet.

Case.—A lady had a disturbed action of the *Heart*, which caused her much anxiety, and having suffered from slight attacks of gout in her feet, at different periods of life, this together with other circumstances left no doubt in my mind of the arthritic character of her complaint. A few *leeches* were applied to one of the feet, by which the heart's disturbed action was quickly subdued. On the following day the skin of the foot was much irritated from the leech-bites, and an erysipelatous inflammation ensued, which subsiding, gout attacked the foot, and the affection of the heart was effectually relieved.

What has now been said relative to gout applies also to *Rheumatism.* It has already been observed, that it is by no means uncommon for a person who is afflicted with rheumatism, and who at the same time receives some internal injury, to have the injured part attacked by rheumatic inflammation. This also appears after operations, and is more distinctly illustrated in operations performed on the eye than, perhaps, in operations on any other organ, from the circumstance, probably, that the eye is very subject to rheumatic ophthalmia, as well as from the external characters of the disease being very remarkable.

Case.—Some years ago, the lens was extracted from a medical practitioner, who had, unknown to me, very much overheated and fatigued himself on the morning of the day on which the operation was performed. He was soon afterwards seized with rheumatic pains in various parts of his body, and at last the eye became affected with rheumatic inflammation, which yielded (as shall be more particularly explained when treating of rheumatic inflammation) to sudorifics and the internal use of *cinchona* combined with *soda* in small doses.

The Treatment of Wounds and Injuries.

The treatment of all wounds and injuries is to be conducted in every respect on the same general principles as have been explained at some length when speaking of wounds made by the surgeon. The hemorrhage accompanying them is to be regulated in the same manner, permitting the wounds to bleed freely in all patients in whom much febrile excitement is to be apprehended,—bringing the divided parts and keeping them together by the most simple means, when reunion by adhesions is desirable,—covering the exposed surface of the wound simply with coagulated blood, when the integuments are either destroyed or displaced,—relieving pain and tension by the repeated application of leeches in numbers, and at intervals proportioned to the extent of the inflammatory symptoms,—and, finally, having recourse to free venesection, with antiphlogistic remedies, whenever there is any general febrile excitement.

When the soft parts are only bruised, and consequently no blood has been lost by the injury, local bleeding is in almost every case imperative, and when not sufficient to allay the pain and inflammation, venesection should be freely employed. The subsequent general treatment becomes however the more urgent, as no previous treatment could have been adopted; and hence in injuries of every description, the first measure should be, the local treament of the injured parts; but the surgeon should lose no time in becoming acquainted with every circumstance relative to the patient's previous state of health, and any peculiarity of his temperament and constitution, so that he may not only be prepared to meet with and combat them, but that he may also use every possible means to prevent such constitutional effects from influencing the state of the wound. The same remark applies to all diseases, and every observant practitioner is aware that in inflammatory complaints, after the feverish state has been subdued, a class of symptoms frequently supervenes, which arises from a disordered state or disease of some organ which had existed previous to the febrile attack, and which state requires a separate system of treatment.

Before concluding the observations I have to make on the treatment of patients under operations, it may not be out of place here to notice, that in almost all those diseases over which medicine has the greatest control, and for which rational principles of treatment are established, these principles consist in a more or less strict imitation of the very process which nature herself employs for the cure of the diseases.

Indeed, a due observance of the natural phenomena of disease, constitutes the basis of all sound therapeutical knowledge, and the remedial means we possess; and the principles on which we act in the cure of disease, are nothing else than an imitation of, and are employed in conformity with, those natural indications. Reflect on the mode of treating many diseases, and you will perceive abundant illustrations of the observation now made. It is well illustrated in the treatment I have recommended of wounds after operations, or from accident, where a covering of coagulated blood is the best dressing which can be employed—one which is superior to all sanative ointments, medicated plasters, and complicated bandages! Thus, too, we endeavour to restore the functions of the skin in catarrh—a derangement of the function of the cutaneous system, causing the catarrhal affection. We remove a quantity of blood when there is a congestion of that fluid, and when nature herself may be observed making an effort for that purpose from the nose, the lungs, or the bowels,—and all the means art has contrived to arrest the bleeding of a wounded vessel, are in conformity with, and in strict imitation of, the process which nature employs to plug up a wounded artery. By the exhibition of an emetic, we assist the imperfect vomiting which the system employs to relieve the stomach of improper food, or unhealthy secretions,—and we give purgative medicines when the natural efforts to evacuate the alimentary canal are inefficient. For the cure of aneurism, too, it is on one principle—that of getting the blood to coagulate to strengthen the sac and prevent its bursting, on which all our systems of medical treatment, as well as our operations, are founded. We dress a wound with lint or a plaster, in place of the incrustation of the inspissated pus which nature employs,—and we assist nature in bringing gout to the extremities from a vital organ, by the application of stimuli to the feet.

Concluding Remarks.—Enough I hope has been said to impress on your minds the importance, the difficulties, and the dangers, of surgical operations, and to explain the necessity of acquiring a comprehensive knowledge of medical science, not only to enable you to select, prepare, and afterwards to treat, patients on whom operations have been performed, but especially to enable you to mitigate those diseases, which, when allowed to proceed uninterruptedly, can only be relieved by the aid of an operation. Nothing indeed can be more reprehensible than the fact of some surgeons presuming to despise a knowledge of physic. Such a sentiment is fraught with evil in the education of youth, and highly pernicious to society.

In concluding these observations on the subject of surgical operations, it may be thought that I have been too tedious; but due attention to, and minute acquaintance with, everything relative to this subject, will be of the greatest use to you in future practice, for there is no author to whom I can refer you, who has treated, in so comprehensive a manner, on these points, as their importance appears to me to merit. Indeed, I am fully persuaded that many of those operations which are every day perfectly well performed, and which, nevertheless, prove unsuccessful, owe their want of success entirely to inattention to the previous and subsequent treatment of the patient, and to a disregard of those peculiarities of individual temperaments, constitution, and system, which I have endeavoured to point out in the preceding lectures.

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